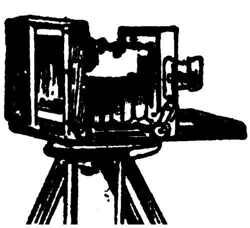
THE INTERNATIONAL ANNUAL OF ANTHONY'S PHOTOGRAPHIC BULLETIN

VOLUME XIV
FOR 1902



The International Annual
of
Anthony's Photographic Bulletin
and
American Process Year-Book

VOLUME XIV FOR 1902

Edited by
W. I. SCANDLIN

PUBLISHERS

NEW YORK
E. & H. T. ANTHONY & CO.
122-124 Fifth Avenue
17th and 18th Sts.

LONDON
ILIFFE & SONS, Ltd.
Sole Agents in Great Britain and Ireland
3 St. Bride St.
London, E. C.

PRESS OF ANDREW H. KELLOGG,
409-415 PEARL ST., NEW YORK, N. Y.

PREFACE

IN placing the Fourteenth Volume of the INTERNATIONAL ANNUAL before the public, we would extend our hearty thanks to its many friends, old and new, who by their generous co-operation in the contribution of articles and illustrations have made its production possible. The preparation and compilation of material so cheerfully provided is a pleasant task, and one that brings author, illustrator and editor into close fellowship with each other. It has been the aim of the editor to present the articles and illustrations contributed, in such a way that they will convey useful information to the many readers of the ANNUAL, and to make the volume as perfect in its technical execution as possible, that it may stand as an example of good book-making throughout. We send forth this volume to its readers in all parts of the world with the hope that they may derive from its contents as much pleasure and profit as we have in preparing them. Our thanks are due to our publishers for their liberal policy and support toward making this volume what it is.

THE EDITOR.

New York, November, 1901.

INDEX TO ADVERTISERS

INDEX TO SUBJECTS

TABLES AND FORMULAS.

INDEX TO AUTHORS

ILLUSTRATORS OTHER THAN AUTHORS

Photogravure [illegible]

PORTRAIT

From a negative by [illegible] Schumacher, Los Angeles, Cal.

THE INTERNATIONAL ANNUAL

OF

ANTHONY'S PHOTOGRAPHIC BULLETIN

AND

AMERICAN PROCESS YEAR BOOK

1902

PHOTOGRAPHING FOR PLEASURE

By S. E. Kelf

TEN or more years ago photographing for pleasure meant in many instances carrying about twenty-eight pounds of apparatus if you required a decent size picture, and in some instances, some one with you to drive away the youngsters that obtruded themselves in the view. All that has now changed, and you can get an instrument to do the same work weighing twenty-eight ounces. Nowadays almost everybody takes photographs. But do they continue it long? And if not, what is the real cause of their throwing the camera on one side? It is not that they have the wrong kind of instrument; it is simply want of encouragement. Although I have been an ardent photographer for several years, still I have periods of depression myself in the art, and so neglect many good opportunities. It was this depression just before starting for my annual holidays that caused me to leave my apparatus behind. Now I feel sorry. Just where I am writing this there are some lovely views of rocky scenery on the coast of the Isle of Man, and yet I am photographically helpless. The encouragement, which I was mentioning, is a want of sympathy or fraternity among photographers. Photography having become so popular and universal, everybody pretends, particularly if they have a camera, to know all about the art, whereas in many instances, they only are acquainted with just the necessary requirements to release the shutter or alter the stops, or adjust the focus of the sub-

ject. So, should you speak to them on photographic matters, they frequently assume an indignant air at any one who should have the assumption to ask them to impart any of their photographic knowledge, and want to be what they are, strangers.

A little sympathy and friendliness between persons who are out and about in quest of pictures would do an immense service in further popularizing one of the best refining influences, viz.: photographing for pleasure. The camera would not be so readily discarded if several failures did attend their efforts, nor would they be discouraged even if they only had an occasional success, if they had more sympathy and less badinage from their brother photographers, their friends, and the public generally.

HOME PHOTOGRAPHY

BY FREDERIC COLBURN CLARKE

(Illustrations by the Author)

THE subject of home photography, both from an amateur and professional standpoint, has always had a fascination for me.

For an amateur, what is more pleasant than a record of his home life, gathered together from year to year, that in later days, perhaps in a foreign land, he can look over, surrounded by new friends, and thus live again in memory the scenes he has taken the time and care to place on record? I have before me as I write a photograph of my old home, surrounded by big maple trees, with my sister gathering pansies by the porch, taken one summer day years ago. But time will never dim the recollection of the place, nor the day, nor any of the associations connected with it. Yet it was not much trouble to take the picture—just a moment of time.

And who would not envy the young mother her possession of a photograph of her first baby, which I have here put before you? Could manual dexterity improve the happy expressions caught on the sensitive plate in a fraction of a second? I have heard my confreres bitterly complain that it was of no use to try to take children, they were so confoundedly restless. Here is a direct refutation of the statement. This print was made from a negative exposed only one-fifth of a second, by the light of the two windows shown, and a third similar, to the left, shaded by a porch roof and lace curtains inside, as you see. No; it is not the restless children, nor the maker's

plates, nor the bad camera, but the man behind the chemicals that is to blame for poor results.

I have always thought it advisable, in taking photographs of celebrated people, to make a few negatives that will yield brilliant, contrasting prints, suitable for reproduction in the daily press, even though they be never used for that purpose. By contrasting prints I

mean not necessarily one lacking in delicate gradation of half-tone, but one so massed as to black and white effect that, no matter what the grade of reduction used, the relative color values will remain the same; as in the picture of Miss Maude Adams, in her white L'Aiglon

costume. Had a light background been used, the figure would not have enjoyed the relief it now possesses, nor would it in print so soon attract the eye. For theatrical work such poster effects are sometimes worth large sums of money to their fortunate originators; so a word of advice in regard to this point comes not amiss.

Perhaps you take a figure study, in which the costume falls badly, or the limbs are distorted in perspective. Shall you throw away the negative? Not so. Of late, the process of brush develop-

Copyright, 1901,
by Frederick Colburn Clarke

ment of platinotype paper has obtained much notice in the public photographic journals, and the initial piece of this article shows a head so treated. Printed as a whole, the figure is not pleasing, but as here represented, it fills a space and fulfils an object that in its original form were impossible. In taking photographs for the trade of people in their homes, it is sometimes a good plan to take the

family dog; for, as a rule, the pet of the house gets a good deal of attention, and even a dog is not to be despised if the lady orders a few dozen carbon prints of him. So I will leave you to guess why I took a photograph of

H. R. H.

GUM PRINT PROCESS FOR THE PROFESSIONAL PHOTOGRAPHER

By Florence

(*Translated by Henry Dietrich*)

LIKE many other novelties, disregarded but finally favorably received, the gum print process has at last broken the ice and now enjoys a pretty good reception. Some of those who appreciate it do not favor its introduction on account of business reasons, but, notwithstanding, remarkable as it may appear, point to the value of the gum print for artistic photography.

A good many professional photographers can not comprehend what one or the other positive processes have to do with "art in photography," and, indeed, if we follow the apparent aim and object of the promoters of the gum print, we shall find that they too, seem to endeavor to imitate the "modernists," who aim to represent clouds, mountains, trees, and scenery of all kinds with the aid of the modern torchlight illumination. Sometimes they create something that flatters their own artistic sense, but which few others will think worth looking at.

However, these friends of the gum print obstruct a prosperous development of their favorite process and its general introduction, forgetting entirely, that the professional photographer and the independent amateur differ widely in their tasks, and that the process may only be of use to those who appreciate its advantages and limitations.

How it may find application we will endeavor to suggest. The gum print characterizes itself as a process which connects photographic truth with the effect of the graphic arts. Particularly with regard to the latter it is capable of a great deal of modification, and thereby permits what is not possible with any other photographic process, namely, a sketch-like production of a picture from a negative rich in detail. The determination of the character of the picture is in the hands of the operator, and with the same negative he can produce the greatest variety of pictures, and he may in this way prominently display his individual artistic ideas. But we must not suppose that this process will readily furnish artistic pictures, except by applying a good deal of time, patience, and reflection to the production of the work. This exception is unfortunately a good deal overlooked, and the results are such as might be expected. The most simple motive seems to suffice for such art students, and the less the final result resembles a photographic print, the more it seems to be thought of. The gum print may be adapted to some uses, if the subject corresponds

Engraved by
National Photo Engraving Co.,
New York

By Geo. E. Tingley

EVENING CALM.

to the conditions limiting the process; but if a photographically correct picture is wanted, then the gum print must take a back seat and leave the front rank to other photographic processes.

The best effects obtained by the gum print are in the reproduction of larger surfaces and forms, where the small details may disappear without detriment to the picture. It is therefore very suitable for landscapes with plain and simple motives. Alpine and marine views, if properly treated, will give grand effects, particularly in larger sizes. Portraits, with the exception of large heads, are less effective.

By Edward Esmonde

If we go now to the practical execution of a gum print, all these points must be clear in our mind, and the limitations of the process must be carefully considered.

The sensitive coating and its composition play an important part, but there is also the disadvantage, that nothing definite can be said as to which is the most available composition for this coating: Good gum printers will often work with several coatings of the paper for a single print in such a manner that, after each partial exposure in the printing frame, a new light sensitive coating is laid on and again printed. In this way full depths are obtained in the shadows, which otherwise could not be possible; but the work is thus rendered difficult and requires a very careful handling, if the intended effects are to be obtained. For the professional photographer it is decidedly better to make the coating so thick that with one print sufficient depth is obtained, and the composition of the coating must be such that without any particular manipulations a good picture can be developed. To produce such coating is not easy, particularly if negatives of different characters have to be printed. It is therefore advisable for those who do not care to lose time and trouble in tests, to work first with paper bought from the dealer, and later on to prepare the paper themselves. Paper bought in market has always to be treated according to the formula accompanying it before use. With home-made paper certain modifications may be allowable. It is especially important to use such a paper as can be developed simply with water, the pictures obtained in this way being not only more harmonious, but showing also much more detail.

The question of how to sensitize is an open one. The sensitizing of the paper by placing it upon the chrome bath is simple and sure, though not exactly easy, and, as experience has shown, this method produces good results if one knows how to handle the paper. This method can be applied to paper bought in market and also to home-made paper, and has the advantage that it will not spoil and that a pretty strong chrome bath will have a somewhat modifying influence upon the character of the picture.

The fineness of the grain of the picture depends upon the thickness of the coating and the time of exposure. If one has to work with thick coatings, a longer printing time is required. For smaller pictures or those very rich in detail very thin coatings should be used, and thin negatives with much detail.

The printing time must be well regulated, as corrections during development are difficult and the picture itself will suffer. But the development should by no means be forced. The process is entirely different from that of the carbon prints, and the development takes oftentimes from forty to sixty minutes. The most available colors for the professional are black, brown, and red.

SCALE OF MEASUREMENT IN PHOTOGRAPHIC WORK

By Joseph N. Bradford

At the present time (and it will continue in the future) photography lends its very valuable aid to fields of work and investigation innumerable, but the assistance rendered in connection with scientific and technical subjects is one of the most valuable.

In no line of scientific or technical work can the aid of photography be ignored. This being the case then, a photographic representation should present the maximum information it is capable of giving, but it must be admitted that such is not the fact in many instances. This is due in part to the scientist or engineer calling upon some one to do his photographic work who does not appreciate the requirements of scientific accuracy and completeness. This emphasizes the necessity of each individual giving some attention to photography in order that he may do his own work or properly direct it.

With the aim in view hinted at above, this brief article is written, not that it contains anything startlingly new, but as a sort of a reminder to those who practise this kind of photography, calling attention to a neglected point, which, if included, will render the graphical representation of more value.

Numerous publications devoted to the different branches of scientific subjects—to architecture and to engineering—make extensive

use of photographic illustrations, which in many instances would be of much greater value provided they contained the added information hereafter described.

In graphical representation, applied to scientific and technical subjects, it is extremely valuable to have the photograph present, besides form, some idea of *size,* which can easily be accomplished by placing a scale showing feet, inches, or metric measure in an average plane of most importance, which will appear in the photograph, thereby giving this added value of size. Specimens of natural history, constructional details in engineering and architectural structures, machinery, etc., photographed with a scale, become in a measure scale drawings and consequently are of increased value.

In specimens of objects which have length and breadth but little thickness; that is, they are thin, such as butterflies, thin fossils, etc., the scale of measure best adapted is one made by ruling lines on a card in two directions at right angles to each other, forming a square crossbar and placing this scale just behind the object. The scale, though a little small compared with the object, will be a very close approximation, and, by giving dimensions in two directions, will enable one to locate the different parts by drawing lines, running threads, or placing a straight edge on the photograph.

If the object is one extending in all directions, that is, possessing length, breadth, and thickness, to a considerable extent, the scale should be placed in the principal plane of the object, but to one side, or more than one scale may be used in different planes. The object can be photographed so as to give nearly an elevation, or a plan, or in perspective. In each case place the scale parallel to the principal lines or planes of the object, and in the case of the perspective view the scale will be also in perspective, making it correct for the different parts. Scales can be placed at right angles to each other, and in this way give perspective scales in two directions, enabling one to determine the sizes of the parts in all three directions—length, breadth, and thickness.

By bearing this in mind and using it with good judgment, much may be added to the worth of a photograph taken for its scientific value and not for pictorial results.

The scale value might be further extended, thanks to the perfection of orthochromatic plates and color screens, by adding to the measurement scale one relating to color, conveying some idea of the color of the object, notably so if only a few pronounced ones are present. The subject may be a flower with distinct color markings, an insect, geological specimen, fruit, shell, etc.

To one side place a scale composed of small rectangles colored to agree with the colors of the object and marked in plain letters sky blue, orange, lemon yellow, vermilion, etc. A photograph of this marked color scale may be compared with the specimen, and this, with the measurement scale, give a graphical representation of form, size, and, to some extent at least, color value.

PHASES OF LONDON SCHOOL LIFE

By Geo. G. Lewis

(Illustrations by the Author)

PHOTOGRAPHERS have been commonly divided into two classes—those who take to the camera for a living and those who simply look upon photography as a hobby.

There is, however, an increasing number who do not intend to become professionals, have neither time nor money for merely interesting hobbies and yet are practically forced to enter

Fig. 1. Kindergarten Class, Bellenden Road Infants' School

the dark room and stain their fingers with pyro. by realizing that photography is—if not actually indispensable—so valuable that they can not well afford to ignore it.

Among this number will be found thousands of teachers who in dozens of ways press the camera into their service to help them in the work of education.

It affords useful and pleasurable records of classes, drawings, models, games, excursions, etc., and above all it yields lantern slides

Fig. 2. The Geography Lesson

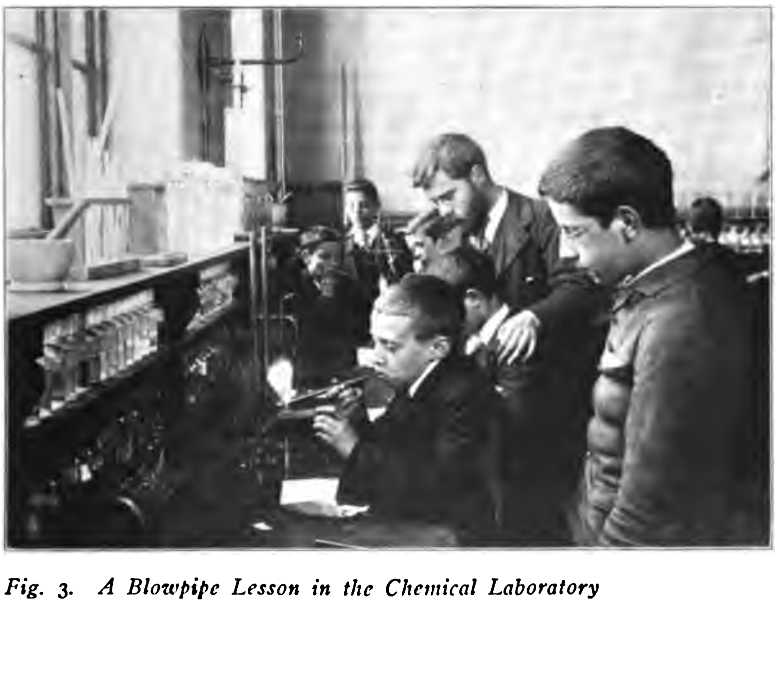


Fig. 3. A Blowpipe Lesson in the Chemical Laboratory

to supplement in a graphic manner the necessarily incomplete verbal descriptions of the geography and history lessons.

The object of this article, however, is not so much to show the value of photography to the teacher (this was more fully treated in an article in the *Amateur Photographer* last year), but to present to American readers some of the more interesting phases in the life of a London Board School boy.

Fig. 1 shows a typical infant class, to which the child goes at the age of five. The little ones are evidently enjoying themselves with the kindergarten gifts before them, but it requires great

Fig. 4. A Lesson in Dressmaking

patience, a rapid plate and a bright day to obtain a negative without movement.

Fortunately School Boards now build their rooms with windows at the side, so that the photographer's task is rendered easier by good lighting.

At seven the children cease to be "infants," and becoming "boys" or "girls," are then usually transferred to separate departments.

Fig. 2 shows a class of eight-year-olds in the middle of a geography lesson. They are learning the definitions, and the map on the board has been drawn by the little fellow standing at its side. When the lads get older and have become more familiar with the

"3 Rs," they spend half a day at a manual training (woodwork) center and another half day in the chemical or physical laboratory, besides taking up such subjects as French, mathematics, physiology, book-keeping, or shorthand. They are able to keep still for a longer time, so that interesting pictures are more readily obtained.

Fig. 3 received an exposure of some seconds on an Ilford ordinary backed plate.

Sometimes the girls learn chemistry, but they usually devote two half days each week to cookery, laundrywork, or dress-cutting. (Fig. 4.)

Land is so dear in London that the playgrounds are necessarily small, but every school possesses one, even if it has to be placed on the roof, and the boys contrive to modify their games to suit the cramped space.

Fig. 5. Football in the School Yard

Fig. 5 shows a diminutive game of football in the school yard, the ball in use being a threepenny india rubber one.

The playground is, however, used for more scientific physical development than the children's games. Each Board School child gets at least one hour's physical exercise, carefully designed to develop every muscle in its body.

London has been forced to give considerable attention to this point, and Fig. 6 shows one of a number of pictures the School Board sent out to the Educational Departments of some of the Colonies.

London boys as a rule leave school when they reach the legal age of fourteen, but every inducement is held out to them to con-

Fig. 6. Girls' Dumb-Bell Drill

Fig. 7. Women's Ambulance Class
Adys Road Evening Continuation School

tinue their studies in the Evening Continuation Schools, which are found within a mile of every home. Here almost any subject can be learned free of charge, though at present there is talk of reimposing a fee.

"Chemistry, as applied to photography," has for the last year or two been sanctioned as a subject of instruction, and the syllabus covers the whole range of photographic operations.

Figs. 7 and 8 show two evening continuation classes at work. They were taken by firing off simultaneously two magnesium flash lamps, one behind the camera and the other from one side. In the latter case a blackboard was set up to screen the light from the lens.

Day school hours are nominally from a quarter to nine till twelve, and from a quarter to two till half past four, but there are very few London teachers who do not spend some of their evenings or Satur-

Fig. 8. *Singing Class in the Evening School*

days in taking their children out for cricket, football, swimming, or excursions to museums, etc.

All this is done quite voluntarily, and the restraint of the classroom being left behind, many teachers find these little outings afford valuable opportunities of cultivating a more intimate acquaintance with their young charges. A feeling of genuine friendship is often set up which reacts on the work in the school, making it more pleasant and effective.

Most schools give a concert of some sort each year to obtain funds for sports and other objects not officially supported by the Board of Education.

The school operetta is very popular just now with teachers, children, and parents, some of the performances being so elaborately staged as to almost rival those of the theaters themselves.

Fig. 9. The Dance of the Vampires

As these usually take place in winter, teachers often find a difficulty in obtaining respectable pictures of their actors in the school itself, and the school yard makes too cold a studio. In such cases the writer has found it useful to give four or five seconds' exposure with the daylight available and then finish off with a good magnesium flash directed on the dark part of the picture. The absolutely hard effect of the flash-light alone is thus avoided, while the whole of the group is well lighted. The same plan may with advantage be adopted when it is specially desired to photograph a class in dull weather. Fig. 9 shows a group in "The Dance of the Vampires," just the sort of thing boys revel in.

John Bull is proverbially old-fashioned and conservative, but even he is waking to the value of nature teaching. Teachers are now encouraged to take their children for walks into the country and visits to museums.

In Fig. 10 is seen a physiography class (boys aged twelve to fourteen) searching for fossils in a chalk pit on the North Downs of Surrey.

Lately the boys have, like their elders, been filled with war ideas, and nothing is more popular than a little sham fight with toy pistols, using caps. The two lads in Fig. 11 are supposed to be scouting.

A few teachers have ventured on taking their boys

Fig. 10. Searching for Fossils

away for a week's educational trip, but, without any aid from government, this must always be done on a limited scale. Fig. 12, however, shows a party of forty-four London boys, who saved or secured for themselves a sovereign each, and were taken by their teachers for a week to Chepstow, in Monmouthshire. During this time they examined Gloucester Cathedral, explored the Royal Forest of Dean, collected fossils from the coal mines, visited the great coal port of Cardiff, admired the lovely scenery of the Wye (the nearest approach to cañons we have), and on the ruins themselves heard the stories of Chepstow Castle and Tintern Abbey. The door of the latter forms the background of the group shown in this illustration.

Fig. 11. The Scouts

Fig. 12. Bellenden Road Boys visit Tintern Abbey. Week's Educational Trip

MY FRIEND THE ENEMY

By F. Dundas Todd

DR. JOHNSON said that he dearly loved a good hater. I don't know what called forth this remark from the Doctor, but I suspect it was because the animus of hatred aroused his opponent to the point of expressing his opinions very emphatically and decidedly, thus by a sort of reflex action wakening up the learned Doctor's mind and setting it to work with renewed vigor. To me it is absurd to hate those that differ from me, for, as a matter of fact, I love them much better than those who agree with me. In my calf days, at a little society party, the hostess introduced me to a young lady, with a request that I should see her home, remarking that I would find her exceedingly agreeable. I certainly did. As we started on the homeward journey I remarked that it looked like a beautiful night, and she at once agreed. After a few minutes' silence I hazarded an opinion on the party which we had attended, and she agreed with my ideas. Again silence reigned, and once more I started the conversation by commenting on some of the individuals who had been present, and again she agreed. I thought I would change my tactics, and reverted again to the weather, saying that in my opinion we would have rain very soon, and she agreed with me. She was certainly the most agreeable young lady I had ever escorted home, and the most uninteresting. Her entire vocabulary consisted of "yes, indeed," "no, indeed," uttered in the pleasantest and most agreeable manner possible, and that was all. When I bade her good night I lifted up my voice and prayed that in the course of my career I would never again meet such an "agreeable" person.

The individual I like is one with points sticking out all over him, and the more of these that pierce my skin the better I like him, for he introduces me to new ideas and new sensations. For a year or two I have found a vast amount of pleasure in differing very decidedly from a number of amateur photographers in the East as to what constitutes art. Again and again I have expressed my opinion of their pictures in very plain language, and they, in turn, have as decidedly told the world what they thought of my notions. We could not agree, but I found them exceedingly interesting, and so whenever it was my fortune to wander to the Eastern States I invariably sought them out and spent a few hours in their company. I was very anxious to get an exact conception of their point of view, and also to be able to express my own in very definite words. But for a long time the difficulty appeared insurmountable. I felt their notions were very nebulous and prob-

ably they held the same opinion of mine. In the spring of the year I had the pleasure of meeting a few of them for an hour, and one sentence uttered by one of my strongest opponents gave me the key to their ideals and at the same time my own, for it pointed out the differences between us.

To them art is an abstract conception. To me it must be concrete. They consider a piece a paper as an area to be broken up into minor spaces of light and shade, each of which must be pleasing in itself, and all must form a harmonious whole. In their estimation the objects which mark the boundaries of these spaces need not be like anything in the heavens above or the earth beneath or the waters under the earth. They need not necessarily be beautiful in themselves or interesting so long as the end desired is attained. To me the sense of beauty is an instinct planted in the mind of man for a material purpose; that being to interest him in his environments so that he may be tempted to study nature and nature's laws and thus adapt nature's products and processes to his physical well-being. Therefore, while I have every sympathy with the abstract conception of beauty held by my opponents, I want them to utilize products of nature with which to convey their ideas, and the more charming the appearance of these objects are the more pleasing is the picture to me.

One of my very practical business friends has a very epigrammatic way of expressing his ideas, and one day he said to me: " There is no need to do business with disagreeable people when there are so many nice people in the business world." The same idea is applicable in picture-making. When there are so many beautiful objects and people all around us, why should anybody use for pictorial purposes objects or people that are not pleasing to the average eye? And this is just what many of my pictorial opponents have been doing. Again, to them nature is not in itself beautiful. To me it is intensely so, and I never yet saw a reproduction of a natural object that was one-tenth so interesting as the object itself, because, in addition to its beauty of form, there were present the anatomical, physiological, and chemical features, that in themselves were positively enchanting and exhilarating.

To my pictorial enemies, then, I greatly give thanks for having aided me in determining, to my own satisfaction, what is the purpose of the sense of beauty in man.

SOME RECENT WORK IN ZOOLOGICAL PHOTOGRAPHY

BY DR. R. W. SHUFELDT

(Illustrations by the Author)

Young Hawk

ILLUSTRATIONS of plants and animals obtained by means of photography from the living specimens have steadily increased in favor both in the estimation of publishers and authors during 1901. It was only the other day that I was examining a scientific publication of the Field Columbian Museum of Chicago. It was illustrated with nearly two hundred figures of the skulls of North American mammals, and many of them were excellent, notwithstanding the fact that they had all been photographed against a jet-black background—an unfortunate mistake, as I have elsewhere demonstrated. Then, again, I have recently seen a book published by the Scribners on "Our Native Trees" that interested me not a little, as nearly all of its numerous illustrations were from photographs of the trees, the leaves, fruit, trunks, flowers, etc., direct from the specimens just as we find them in nature. They are very effective and true to life. And, I could mention quite a number of other volumes wherein the figures of all kinds of subjects, both animate and inanimate, were obtained by photography direct from the specimen, whether it was a bird or a mammal, or a spray of flowers or a crystal.

During the year 1901 I published, in illustrating my zoological work, quite a large number of such figures, such as flowers, shells, plants, insects, fish, reptiles, birds, mammals, and so on, but in the present contribution I desire to bring before the readers of THE INTERNATIONAL ANNUAL three or four figures, reproductions of photographs of the living forms, made by myself, that heretofore have not been published anywhere, and offer a few remarks about them.

Apart from the young hawk seen in my initial cut, these figures are of reptiles, amphibians, and mammals, or rather selections from my work with such types. In Fig. 1 we have a right lateral view of a handsomely marked specimen of our common toad of the Eastern United States (*Bufo lentiginosus*). It was photographed natural size from life indoors, all of which applies to Figs. 2, 3, and 4.

Fig. 2 is of a beautifully marked specimen of our pretty little garter snake (*Eutaenia s. sirtalis*). It was taken by me in Northern Virginia, close to the Potomac River, and just above the city of Washington, D. C. I had it alive in my possession for nearly a week, and it took me the best part of a forenoon to get its picture.

In Fig. 3 I submit the best picture I have ever succeeded in making of our well-known box tortoise (*Cistudo carolina*) of the Eastern United States. It is the only one wherein the bright orange markings are indicated upon the carapace and the head. He is

Fig. 1. The Common Toad; natural size, from life

represented in the act of walking down a gently inclined plane composed of an amorphous gray rock, with a small plant growing in the background. This is a male specimen with a wonderfully perfect shell.

A still more interesting picture is seen in Fig. 4. It is of a kangaroo rat (*Perodipus richardsoni*) from Kansas, a little-known form, and one which heretofore has not been published by any scientist. I had three of these very interesting little mammals alive in my studio for some time, and secured three good negatives, of which this one has been generally considered the best. It shows the animal life size, and in the act of feeding upon the bark of some roots overhanging a shallow burrow he had dug for himself in the place where I had him confined.

But to return to the consideration of Fig. 1. It seems to me that I have endeavored, for the last three summers, to secure a satisfactory negative of a living toad. Every time I have failed, until the present summer, and they are certainly very aggravating subjects, and to either " look pleasant " or to pose gracefully seems to be utterly beyond the comprehension of that perverse little amphibian. Three years ago I tried for an entire forenoon to make a negative of one of them, an unusually big fellow, and failed utterly. No sooner was everything ready to make an exposure than Lord *Bufo* would make a sudden hop of about six inches, and I have known one to keep this practise up until it seemed to me that he

Fig. 2. A Garter Snake

had intentionally hopped out of focus at least one hundred and ten times. Patience is the only thing to exercise, however, in such an emergency as this, and absolutely nothing is to be gained by an exhibition of anything bordering upon harshness. Sometimes I have succeeded in cases like this by resorting to the simple expedient of placing a little box over the subject, the toad having been duly placed at the focus point, and allowing him to remain quiet for several minutes, then, upon cautiously lifting the box, he will often remain in a desirable attitude for a sufficient length of time to insure a good exposure. In a bright light, and using a small diaphragm, it is not necessary, with a Cramer's instantaneous plate,

Fig. 3. The Box Tortoise

to have the exposure exceed three or four seconds. The picture of the toad reproduced here is, as the reader will see, simplicity itself. There are no " accessories " in the way of plants, stones, or even bare ground. The little fellow is portrayed as merely standing upon a piece of dead tree trunk—a place where any toad might stand in its natural habitat. If a more varied picture is required, it is just as easy to use a piece of tastefully selected sod for the purpose. And, if the artist desires to perpetuate a pretty zoological myth, he can put himself to the trouble of photographing his specimen under a big toadstool. Some toads make better subjects than others; that is, in regard to size, characters, and temperament. The one here chosen is rather under size, and was altogether too active.

To select, we should obtain one of phlegmatic disposition, with strong topographical characters, and a very light skin with very dark markings. The bigger the fellow is, the better, and sometimes they grow to proportions quite unknown to people not constantly observing such creatures in nature.

Snakes are often harder to photograph than either toads or frogs, but what I have just said in regard to the matter of selecting the proper specimens applies with equal truth to them. To photograph a small snake one can often best succeed by coiling it all up in a bunch on the spot where it is to be taken, and then covering with the left hand. If held for a few moments thus firmly, though very gently covered, and then the hand slowly removed, an exposure can be made at the proper instant with the pneumatic bulb held in the other or right hand. This is the way I proceeded with the very active little striped or garter snake shown in Fig. 2. It will be seen, however, that even in its case it had already started to make off—an attempt that I checked for a sufficient length of time to answer my purpose by blowing directly in its face. Many of the larger snakes give no trouble at all, such as the boas, pythons, and others. Sluggish in temperament, and demanding great reduction in size, it requires but little skill and experience to obtain good negatives of such subjects. On the other hand, such reptiles as the land tortoise and various species of turtles often give no end of trouble. To appear to any advantage at all it is quite necessary that they be in an animated posture at the time when taken. That is, they should be in the act of walking, with head, all four feet, and tail in plain view. Especially should the tail show well, for if it does not, the tortoise generally wears a very whipped-cur appearance, and looks as though it was skulking off somewhere. The specimen shown in Fig. 3 is one of the best results I have ever obtained, and, as an isochromatic plate was employed, the bright orange spots of the shell and head are shown pretty well, particularly on the latter—a fact already alluded to in a former paragraph.

Lastly, in so far as the present article covers the ground, we have the problem of the photography of small mammals to deal with, and they are by no means easy subjects in many instances. In

this direction most of my experience has been with a number of species of American squirrels, with muskrats and field mice, opossums and raccoons, and other types. Next to the untamed red squirrel, however, I have never met with a small mammal that in any way so taxed my stock of patience as did the pretty little kangaroo rat shown in Fig. 4. Still, after I had kept several of them in my study, as I have said, for several days and mastered their habits and characteristics, I found the matter much simplified, and I secured three excellent negatives within twenty minutes, having utterly failed the day before, after a trial extending over six hours. Extreme gentleness with these nervous little subjects and great patience are the best contributors to final success. Always focus first on the place where the animal is to stand while the picture is being taken, then use any art at your command to induce the subject to pass on to this place and in the attitude you have fixed upon in your mind's eye for it to appear in the photograph. The rest is accomplished by an observing eye, a quick plate, a rapid lens, and a small aperture, with the exercise of the requisite amount of nerve and strict attention to the matter in hand, all of which is very simple, yet preeminently essential to success in the photography of live animals of nearly every kind, both great and small.

"WHAT SHALL I TAKE?"

By H. H. Williams

THIS is a puzzle to many beginners and, I fear, to many who are *not* exactly beginners. Here is where the "seeing eye" comes in, for, strange as it may seem, there are many eyes that see little, aye, very little indeed, and often fail to perceive anything at all, in that which is to the "seeing eye" really beautiful.

There are some, I am sorry to say, who see much that is best left unseen, or, anyway, unrecorded. One day I came across five or six pictures made of an execution. Surely that man deserved having his camera broken over his foolish head.

I know of one man who made this rule and kept it: "I will not make any picture that I would be ashamed of my mother or sisters seeing." That is a safe rule to go by.

There is another class of pictures that are nearly as bad, what we may call the raucous, for they show plain footprints of inanity. They are simply empty, nothing in them—no purpose whatsoever. Just made for the sake of firing off the shutter.

As far as I can see this class comprises over 75 per cent. of the Push-the-button-ists; as a rule they don't expect any result. A contrast to this lies before me as I write—a 12-roll, sent by a lady

Fig. 4. A Kangaroo Rat

who says she is a beginner: eight are good, two poor, and a double exposure. Every one shows motive, and four really good composition. If they had come into my hands sooner, I would most certainly have asked our editor to reproduce one or two for the encouragement of other beginners.

Now, beginners like the lady I have just mentioned form a class that I wish to help all I possibly can. A word of warning from these same pictures. Most of them were taken too near the middle of the day. The sun was almost overhead, and consequently the shadows were very small and the pictures flat.

The old rule of the best photographic day being one with white clouds floating in the sky is still good. Where there are figures, particularly of girls in white wearing sun-bonnets or large hats, wait till one of those white clouds covers the sun. You will not then be so apt to change your best girl's face from white into black. Do not, unless absolutely obliged, make snap-shots with the sun behind you. Try a few sheep, once with the sun on your back, and then dead against the light. In the latter case you will, of course, take care that the sun does not shine directly into your lens. Carefully compare the resulting pictures, and you will see which was best worth taking.

A fragment of colored glass is a great aid in picture-making. We will say that you have chosen your subject, and that it looks very pretty on the ground glass, the colors are *so* beautiful, and harmonize *so* well. Reduce it to monotone by interposing the colored glass. What a change! All the beauty is gone! A photographer must learn to reduce what he sees to black and white, else he will fail many times and not know why he has done so. Now, looking at things not as they are but as the camera will reproduce them is no easy matter, and requires a deal of careful observation, as the photographic values of many colors are quite different from the impression they make on the eye. For instance, a few red flowers among green leaves will light up wonderfully to the eye, while in a photograph they will be darker than the leaves.

A few dozen plates used simply as experiments are by no means wasted. They are of the greatest possible value. Choose a simple subject, and try it from two or three points of view, making careful notes of each and comparing the results. You will then have made a long step toward answering the question with which I began this article, "What Shall I Take?"

THE BUSINESS END

By E. S. Kibbe

IT is a matter of surprise to me that so few photographers pay any attention to the " business end " of photography. They take in money and pay it out, but do not know how much. In my experience, which has extended from Michigan to Mississippi, I find that not one photographer in twenty can tell the amount of cash he has taken in or paid out during the year. Again, there are a great many who, while they preserve their negatives, do not file them, and consequently are obliged to handle and examine a large number in order to find any particular one, at a loss of much time and patience. It takes much less time to mark each negative with the name and number, put them away carefully, and enter them alphabetically in a book kept for that purpose than it will to search through the entire pile for the one desired, and then, perhaps, not to find it after all, as the one you especially want is almost always the one missing. Then, in case you wish to sell, your indexed negatives are of some value, but if they are not carefully filed a stranger coming into possession of them will be unable to locate them, and they are worth to him only what they represent as dirty glass. It is the same with the financial part of the business. If you keep track of all you take in and pay out, at the end of the year you can tell exactly what you are doing, and if you wish to sell a prospective buyer can judge whether or not the place is worth what you ask for it. You have established a gauge upon its value. As for me, I would pay much more for a gallery kept in this manner than for one where there is no record of the business or system in filing negatives, as I am always suspicious of the business possibilities of a place so conducted. I therefore say, *try it for one year* (if you are not already doing so), and you will find it pays, in time saved, to say nothing of its advantages in other respects.

AMIENS

By T. Perkins

(Illustrations by the Author)

MANY are the modern tourists, among them no small number from the States, eager to see the chief cities of the old world, who rush with feverish haste from place to place, and so miss much of interest that may be found in the smaller towns and in out of the way places of country districts.

The traveler provided with a ticket from London to Paris, via Calais or Boulogne, who does not break his journey as his ticket allows him to do, at Amiens, where almost all the admirable fast and punctual trains of the Chemin de Fer du Nord stop, makes a great mistake. For within ten minutes' walk of the station stands a church which, if it is not absolutely the finest Gothic cathedral in the world, yet has few rivals. Here we see a façade enriched with the most magnificent carving, and three western portals on either side of each of which are statues and bas-reliefs which so charmed the great English art critic and essayist, John Ruskin, that he wrote a book under the name of "The Bible of Amiens," to interpret to the English reader the lessons that the thirteenth century French carver set for his contemporaries to read on this superb west front. Here, too, we may note the perfection of engineering skill which supported the stone vaulting about one hundred and forty feet above the pavement by a carefully designed framework, consisting of vaulting shafts within and flying buttresses without, so that it has stood unmoved and uninjured for over six hundred years, thus enabling the builder to make the upper

Cathedral and Bishop's Palace from North

West Front of Cathedral

part of the building almost a continuous sheet of glass for the admission of light and the display of painted glass, which unfortunately has in large measure disappeared. This is the highest Gothic vault in France save that of the choir of Beauvais, which, however, from the very first gave trouble, and has had to be braced up with iron rods and otherwise supported to keep it standing. Amiens, too, can show wood carving in the choir stall which can not be matched in any other church—no less than four hundred subjects illustrated by three thousand six hundred and fifty figures carved with the most marvelous delicacy and detail may here be seen. On the walls that separate the choir from its aisles are eight groups of stone carving illustrating, on the north side, the story of St. John the Baptist and, on the south side, the story of St. Firmin, the missionary who first preached the Christian faith at Amiens, and rendered himself obnoxious to the Romans by turning the place upside down with his new teaching. After forty days he was put to death, in the hope that with his death the pestilential heresy, as it appeared to the Roman priests and governor, would be heard of no more. A vain hope, for here, as elsewhere, the blood of the martyr was the seed of the Christian faith, and from the days of St. Firmin, who is counted as the first bishop of Amiens, there has been an unbroken line of Episcopal rulers, and from the fourth

Buttresses of Apse

century to the thirteenth church succeeded church, each finer than the preceding one, each one as a rule perishing by fire, in several cases caused by lightning, until the present structure rose in the thirteenth century on the ashes of its predecessor, Bishop Everard de Fouilloy laying its foundations in 1220, and his successor, Bishop Geoffray d'Eu, consecrating a portion of it for use. The whole structure was finished nearly as we see it to-day in 1288, though the side chapels of the nave, the upper part of the western towers, and the arrow-like spire or flèche were all added afterward.

The visitor who has no intention of exposing plates should give half a day at least—a whole day would be better—to the examination of this magnificent church; the photographer will find work for many days ready to his hands. From several spots fine exterior views may be obtained, one from the river, which may be reached by going down a steep street that leads from the square of St. Michael, where the statue of Peter the Hermit stands, to the northeast of the apse. This view requires a morning light; a market day should be chosen for the sake of the foreground. The west front requires a short-focused lens to get the whole on the plate, but the porches may be easily taken all three on one plate. To get the individual porches is more difficult, from the fact that the ground to the west is much lower than the floor of the church. The statues also are worth several plates, and the medallions below them representing virtues, vices, the signs of the zodiac, the agricultural work of the various months, incidents in Old and New Testament history, may be taken in detail. Photography inside the church is absolutely forbidden, unless the photographer has previously obtained a permit from the Ministre des Cultes at Paris. The church is a national monument under government control, and the ecclesiastical authorities of the place have no power to grant permission to photograph. Application should be made by letter some weeks before the proposed visit to Amiens. The camera should be taken to the triforium and the roofs of the aisles for the purpose of photographing the vaults and buttressing.

At Amiens *Photo by Mrs. Perkins*

Amiens is a clean and, for the most part, modest town; some picturesque bits may, however, be obtained on the banks of the eleven streams into which the river Somme divides just above the city, reuniting again to the west of it. The houses built upon the islands

Story of St. Firmin

formed by these streams are the oldest to be met with; their gables and ridged roofs give picturesque sky lines, the bridges, water, and boats in some places lending an additional charm to the composition.

THE APPLICATION OF CELLULOSE TETRACETATE AS A SUBSTITUTE FOR NITROCELLULOSE IN THE PRODUCTIONS OF CHLORO-CITRATE EMULSIONS

By Prof. E. Valenta

(*Translated by Henry Dietrich*)

An English patent was taken out by C. F. Cross and Bevan in 1894 upon the production of cellulose tetracetate by treating cellulose hydrate with acetate of zinc or acetate of magnesium solution, evaporating, drying at 110 degrees, and mixing the powdered zinc or magnesium

acetate compound with acetyl chloride. The cellulose acetate which formed, is removed from the mixture by solvents—for instance, nitrobenzol or homologous substances—and the solution is poured into alcohol, whereby the acetate is liberated in the shape of a flaky precipitate. The solubility of the preparation in chloroform as well as the tendency of these solutions to leave a thin glass-clear film upon a glass plate on evaporation has caused me to make some experiments with this preparation for the production of printing emulsions.

At the request of the Imperial Graphic Institute in Vienna, the firm of Gebrüder Kolker, in Breslau, placed samples of manufactured cellulose tetracetate, $C_6H_6(C_2H_3O)_4O_5$, at my disposal. The preparation forms a white, flaky mass, in appearance slightly like nitrobenzol.

Although the cellulose tetracetate is insoluble in acetone (also in ether, alcohol, and benzol), a solution of the preparation can be diluted with acetone in chloroform. A solution diluted in such a way will stand an addition of alcohol to a certain degree without causing a precipitation of the dissolved acetate. The solution of the tetracetate in chloroform diluted with acetone leaves also, after evaporation of the solvent, when spread in a thin coating upon glass, a tough film, which, in comparison with a collodion film, excels by greater hardness and capacity of resistance. Pure solutions of cellulose tetracetate in chloroform proved not to be applicable for the production of emulsions, because I could not succeed in incorporating uniformly the chemicals dissolved in alcohol without precipitating the greatest part of the same. I obtained better (although not yet fully satisfactory) results with cellulose tetracetate solutions which had been diluted with acetone. Such solutions will stand a pretty good addition of alcohol, and give, by exercising the necessary care, emulsions, which will flow easily and furnish a good printing paper.

As shown by my tests, it is not impossible to produce an emulsion printing paper of very good properties with cellulose tetracetate. The printing papers obtained with these tests showed a very uniformly tough film and a sensitiveness between albumen paper and that of good celloidin papers. The usual toning baths and fixing solutions penetrate easily into the film, facilitating rapid toning of prints on such paper, and the film adheres firmly to the support. Considering gradations, it is about the same as with albumen paper.

It might be mentioned, that the picture film of papers produced with such acetate-collodion emulsion has great power of resistance, that a gradual wearing off of the picture need not be feared, and that it can be worked with ordinary colors, such as are used by the retoucher.

PERSPECTIVE IN ARCHITECTURAL PHOTOGRAPHY

By H. C. Delery

(Illustrations by the Author)

ONE of the greatest benefits which art has derived from photography is the reproduction of works of art from periods more favorable for their production than the present age. And this is particularly noticeable as regards architecture, one of the most prominent of the fine arts. By the aid of photography we can trace the entire history

Fig. 1. In this case the point of sight is badly taken, showing too much of the side of the house and giving it a flat, squatty appearance

of architectural evolution from its very birth, and with far more comprehensiveness than ever pen can describe. We may review the colossal and massive designs of the early Egyptians, noting how the Greeks and Romans, ever with an eye to grace and beauty, formulated the orders of architecture, with their admirable proportions and chaste ornamentations, which to this day are the highest character of design; pass through the stages of Renaissance in Italy, France, and Spain, admire the great Gothic cathedrals of old England, and up to the present age of the obtrusive " sky-scraper " and architectural innovation. Verily the architect of to-day has within his reach a magnificent panorama of the architectural world, af-

fording him a close study of the different styles, which is a source of inestimable value in the preparation of his designs.

But, in order that he may fully enjoy the beauty of these designs, it is necessary that the reproductions should be intelligently interpreted, should contain the souls which the designer intended they should have. Yet we have only to glance at our architectural journals, and we often perceive photographs in which the character and motive of the work is entirely lost, and which are but caricatures of what the architect wished to convey.

This lack of ability to represent architectural work can be traced directly to the neglect of the profession for this most important

Fig. 2. The same residence as Fig. 1, but with point of sight correctly taken

branch of the art. The portraitist undergoes a special training before becoming proficient; architectural photography is often a side issue to the portraitist, or is sometimes done by inexperienced amateurs; hence the many errors so often seen.

In the words of the poet:

> "One science only will one genius fit,
> So vast is art, so narrow human wit."

We truly think that unless one establishes more than a superficial acquaintance with outdoor work, the best results will never be obtained, and he who is thoroughly versed in the rules of perspective and has a good conception of architectural design is surely best fitted to achieve success.

What are the essential requirements of an architectural photograph? The primary requisite of such a photograph is correct perspective. A painter may prepare a picture showing the most

beautiful combination of colors, but, if the motive is badly conceived, his work amounts to naught. And so with architectural rendering—no matter how splendidly lighted the building may be or what exquisite detail may appear, the whole becomes worthless if the perspective is faulty.

Perspective in photography has been described as " a representation of an object upon a plane surface so that a picture shall present precisely the same appearance as the object itself would appear to the eye situated at a certain point." The draughtsman can, by certain mathematically set rules and the skilful manipulation of his lines, attain pleasing results, but with the photographer it is somewhat different; the one deals with the imaginary, the other with actuality. The photographer has three cardinal points to observe: The horizon, the relation of the point of view to the sides of the building, and the proximity of this point to the object.

Fig. 3. Here the station point is located too close to the building and also too near the center

By the horizon is meant that line which is on a level with the eye, and to which all other lines above and below it are seen to converge, until they meet on some point beyond. These lines are known as the vanishing lines and the meeting place as vanishing points. It will be noticed that if we stand on a street lined with telegraph poles, the wires overhead appear to run downward, while the curbing of the street rises until both meet at the horizon; should we ascend the pole, we perceive that while the angles of these two lines change, the horizon remains the same, or, in other words, is always on a level with the eye. Now, in photographing an edifice, it is important that the horizon should be kept at its proper height; for a small building, such as a residence, the ordinary height of a man is the proper distance, but for the very high " sky-scraper " it is necessary that the point be taken at a considerable elevation. These buildings are usually designed with the comparative divisions

of an architectural order: as the base, which generally includes the two or three lower stories; the shaft, occupying the greater unobstructed length of the building; and the frieze and cornice, represented by the last floor. Hence a point of view selected at near the second or third story, or perhaps even higher, appears only natural, bearing the same relation to the building as a point at the usual distance from the ground would to a column of ordinary proportions.

If the horizon is placed at too lofty an elevation, as, for instance, the center of the building, the base and cornice vanishing line become of equal length, and give a very unpleasant appearance, and, if taken at an extreme height, the whole character of the building is lost. In photographing a church with a high tower, the best results are obtained in selecting a view front as if we were taking only the

Fig. 4. Same case as Fig. 3, but point of sight at proper distance and correctly located as regards the sides of building

main body of the building; the exaggerated lines of the tower give it a lofty appearance which it was intended that it should have.

The next consideration is the proximity of the point of sight to the object. Here are often committed the grossest errors. The point is usually taken too close to the object, exaggerating the vanishing lines, causing them to end abruptly, and thereby distorting the image. In no case is this more noticeable than in a building with large projecting eaves. The further we stand from the object the more pleasing will be the result, provided, however, that this distance is not overdone. An ordinary dwelling will look well if

taken at a distance of about twice or three times its height. A building assumes quite a different appearance when seen by us on the street than when fixed by the glassy eye of the camera, and it is particularly when photographing in narrow streets or close quarters that the camerist is put to a severe test; although the building may appear correctly to the eye, still it may be a different matter to obtain the image on the ground glass, owing to the impossibility of properly manipulating the camera. Sometimes in these cases the difficulty may be overcome by slightly raising the horizon and thereby easing the violent vanishing lines.

Fig. 5. An instance where the horizon line is too high, and point badly chosen in front of building. Would be improved if taken from the side and from street line

The third requisite of an architectural photograph is the proper selection of the view-point in relation to the sides of the edifice. In all buildings, one side is usually more important than the others, and this should be given the most prominence and occupy the major portion of the picture, yet not to the detriment of the minor sides, which should show sufficiently so that the vanishing lines are not too abrupt. But by all means a view-point must never be taken which will give equal portion of front and side, making the corner a dividing line and the two vanishing points of same length. The building then assumes a flat, meaningless appearance, which should by all means be avoided. A store front, or one having other buildings in close proximity, so that no sides appear, should never be taken directly in front, but rather a little to one side, to show the return around the openings and give some relief to the work.

The architectural photographer need observe great care in the selection of his apparatus. The camera should be provided with a good rising and falling front, the bellows only of sufficient length to accommodate the lens; a bellows which is too long is very apt to obstruct portions of the plate, especially when using a wide angle

lens, and for this reason also, a square bellows is preferable to a cone. The single swing back is an absolute necessity, and should be hinged at the center instead of the bottom, but the double swing is superfluous. The back, of course, should be reversible, and provided with a level, as it is necessary in all first-class work that the plate be perpendicular. For convenience in working, the tripod should have sliding parts, and end fitted with rubber tips to prevent slipping.

As regards lenses, only two are required, but these can not be too good. The most important is the rapid rectilinear for general outdoor work. This lens should be absolutely rectilinear, possess a flat field and great power of definition, and at the same time be

Fig. 6. A residence in which lines of perspective are well balanced

rapid in action. A picture in which the vertical lines are not perpendicular, but converge to the top, is worthless when considered architecturally. If we observe the contour of the lines in classic work, we notice that the shafts of the columns gradually diminish at the top, giving the appearance of grace and strength to the building, and if these lines are disturbed and badly reproduced, the whole character of the design suffers. But in the coarsest sense of the term, a building with its lines out of perpendicular is an abortion and has no reason to exist.

The lens should possess great power of definition. Perhaps in no other branch of photography is a lens put to such a severe test as in architectural photography. While the artist seeks a blurred

image, the architect demands all the detail which is so necessary for the proper presentation of his design, and to obtain this detail the photographer has much to contend with. The probable extreme elevation of the front board of the camera and the strained position of the swing back are sufficient to test a lens to its utmost capacity, and one which does not fulfil these requirements is not worthy of the photographer's attention.

The rapidity of the lens is a natural sequence of the above condition. When the covering capacity of the lens is strained it is imperative that a small diaphragm be used, greatly retarding the action of the light. The importance of this point is readily appreciated when we are called to photograph an edifice in a crowded thoroughfare where a short exposure is required.

The wide angle lens is the *bête noire* of the architectural photographer, and to it may be attributed the cause of many failures. It should be employed only when strict necessity demands it, and then with careful judgment. The tendency of the wide angle lens is to foreshorten the perspective, produce harsh, violent vanishing lines, exaggerating the perspective and causing distortion. But, as photography is strewn with limitations, the lens, when judiciously employed, relieves many a difficulty. It should possess in like measure all the qualities of the rapid rectilinear.

It is not within the scope of this brief sketch to enter into a detailed argument as to what constitutes the finished picture; the proper arrangement of the shadows, so important in architectural rendering, the treatment of the surroundings, or the technical manipulations; these are items of vital importance and deserve serious consideration. But suffice it to mention that the skeleton having been outlined, the whole anatomy of the architectural photograph, with skilful and intelligent treatment by a hand thoroughly versed in its requirements, will produce a picture which will be a credit to the architect, designer, and photographer.

IN GLACIER BAY, ALASKA

A Leaf from the Diary of Chas. M. Taylor, Jr.

(Illustrations by the Author)

OWING to a dense fog, we are delayed in starting; but at last the mist rises, the bell rings, and amid a chorus of cheers and good wishes we leave Skagway for Glacier Bay. The scenery changes perceptibly as we enter these waters. How rich are the color effects, how sublime the lights and shadows! What dazzling views greet us in this region of perpetual winter! Here ice takes the place of foliage and flowers and the fresh verdure which has hitherto accompanied our passage.

A gleaming wonderland spreads out its wealth of beauty before us.

It is the custom of the steamers to gather their supplies of ice in this region; and now, as the order is given, a small boat, manned by an officer and four sailors, is lowered, and the ship lies at anchor while the search is made for a clear, solid block. This is speedily discovered and captured. A net is adroitly slipped beneath the crystal mass, and it is towed slowly to the side of the steamer; the rope is attached to a huge derrick, and at the word of command the pulleys are set in motion and the iceberg is transferred from its watery bed to the deck of the steamer. It is pure emerald in color.

This is surely the greatest ice storehouse in the world. Thousands of tons float slowly down the water, and through seemingly pathless channels to the sea.

Take, with me, a brief glance from the steamer's deck as we glide past these magnificent shores, at this season of the year flooded with undying daylight. The sun in his descending splendor is visible at ten o'clock at night, and after sinking below the horizon leaves in his wake a twilight that remains to greet him on his reappearance at three o'clock in the morning. You may take an instantaneous photograph at ten o'clock in the evening, and be rewarded by a picture with brilliant cloud effects and a charming bit of scenery. Here the student requires no oil for his midnight lamp, for the great luminary of the Creator is his at will.

The panorama is indescribably beautiful during these hours. The bay is framed in snow-clad mountains sloping gracefully to the water's edge. Wild and picturesque is the view, with its impenetrable ravines, its scintillating moraines and glaciers, its steep gorges and wonderful shapes. But why attempt to describe it? Look with

me. Behold the dazzling glory of it all, and tell me, can any region in the universe surpass the beauty of this enchanting spot? The waters around us reflect in their shimmering waves these fairy views illuminated by the glow of the sun, and softly lave the feet of glaciers and ice-floes whose iridescent colors rival those of the rainbow itself. Now and then a tiny white sail marks the boat of a solitary Indian making some harbor; whither you can not guess, for no human beings appear to dwell in this region.

Hundreds of wildly screeching sea-gulls flutter about the prow of our vessel. A tender misty veil encircles the base of the distant mountains, and still the sun, as in his prime, smiles gloriously, and the huge icebergs, gathering closely about our ship, respond with dazzling light.

Muir Glacier is yet about twenty miles distant, and there is some doubt of our coming into close proximity to this greatest wonder of these Arctic regions, for on the twentieth of last October (1899) the wall of the glacier was so shattered by an earthquake that dense ice-packs are constantly forming in its vicinity, preventing steamers from approaching nearer than six miles from its base. However, our gallant ship pushes forward with determination, and we live in hope.

None of us can forget the experience of these hours amid the massive floes which press so closely to our sides. Varied and wonderful are the shapes of these frozen waters; picturesque, fairylike, grim and awful, their ranks close about us, and we seem to be in the power of the Wizard who holds beneath His spell all these castles and cathedrals, these rocks and trees, these monsters of the deep and creatures of the land, transforming them into ice, and grouping them here as everlasting monuments of His invincible might. Here, set in a background of deep blue, are wonderful icy forests; here stand in immovable majesty the obelisks of the Nile, and about these grand images sport sea-gulls and wild ducks, whole families often perching themselves upon the floating masses, and sailing serenely toward the open sea.

Our passengers are all closely observing the glittering pageant. and watching for the appearance of such creatures as whales, seals, or schools of fish. At times some one startles us with the cry that a seal is visible, basking in the sun on a huge ice-floe. Every glass is quickly leveled in the direction indicated, only to perceive the dense shadow cast by a projecting rock upon the iceberg floating slowly past it.

Here and there on the mountain sides a group of hardy evergreens presents a charming contrast to the glittering masses of ice and snow about it. The temperature falls perceptibly as we advance, and the packs of floating ice around us become more dense, some of them rising eight, ten, and even twenty feet above the water. As fresh-water ice is said to present only one-eighth of its thickness above the water when floating, we are able to judge of the great depth of these bergs. The prow of the vessel is protected by heavy tim-

Engraved by
Central City Engraving Co.,
Syracuse, N. Y.

Photographed and Copyright, 1901,
by J. C. Strauss

VIRGINIA CARVEL, HEROINE OF "THE CRISIS"

bers, and we feel the shock as it goes crashing through the closely packed blue and emerald shapes.

Passing Bartlett Bay, beyond which gleaming summits rise to heights of from 3,500 to 4,000 feet, we glide slowly by Willoughby Island. Strain our eyes as we may, we see no trace of the Silent City which has been said to appear in this region during the longest days of the year. We would give much to behold this entrancing vision, which, it seems, appears only to the natives and a few other highly favored souls. No glow of radiant light upon the mountain front presages the presence of those majestic cathedrals, those gorgeous windows, noble palaces and stately avenues of trees stretching far away in the distance. The solemn music of the cathedrals, the

chimes of bells mingling their happy melodies are not for us, but the beauties of this mundane sphere surround us in rich profusion, and never fail to win their meed of enthusiasm and delight.

Ducks and other aquatic creatures still float and fly quite near, the icebergs grow taller, more picturesque, and the floes clasp us more closely as we advance. Slowly and more slowly still our good ship makes her way, the struggle with the huge blocks sending tremors through her powerful frame. Still she is victor in the battle, crushing one after another the giant masses which try to impede her progress. The screaming gulls fly so near that we are almost tempted to catch one of them and hold him on deck while we demand the reason of this violent disapproval of our proceedings.

Our motion is now scarcely perceptible. The scene about us is

beyond expression. We have encountered a vast army of icebergs which seem determined to prevent our farther progress. Huge, massive, inexorable, they face us in all the varied and fantastic shapes of this frozen region. Here a great elephant would like to twist his trunk about our ship, and hurl it scornfully from his path; here alligators, sharks, and whales are waiting to leap upon us in a body and crush us out of existence. Hundreds of gulls settle upon these icy monsters, fly away at our approach, and as quickly return to their favorite resting-places.

Two large eagles soar above us, circling round and round, as though loth to leave us.

Now we have our first glance of Muir Glacier, about ten miles away and directly ahead of us. We are completely surrounded by the floating ice, and feel constant shocks as the ship forces her way through it, pushing the masses aside, and often lifting them bodily

from the water. We make a detour around the base of a mountain to avoid an enormous impenetrable block.

It is quite possible that we may not reach the foot of the glacier, as the ice-pack grows continually more solid and heavy. Some fear is expressed that we will break the propeller, and thus find ourselves helpless in the power of Alaska's merciless tyrants. The Arctic scenery grows constantly more vivid, our surroundings more startlingly beautiful. We entertain ourselves with the fantastic shapes around us, wild, weird, solemn, fierce, graceful, majestic, and imposing beyond description. Each passenger beholds something invisible to the others, each is thrilled with a mysterious presence which appears for him alone; each, out of the scenes of his life, recalls some likeness familiar to his youth, feels unconsciously the glamour of some olden dream. Inexhaustible is the store from which a universe may draw.

An immense iceberg has just toppled over with a report equal to that of a great cannon. Over and over it rolls, vainly endeavoring

to regain its equilibrium, and ruffling the water into great waves. At last it finds a peaceful bed, and we, too, are relieved when its struggles are over, our relief lasting only until another great berg yields to its inevitable fate, and falls shuddering down among its fellows. The waters are of a greenish blue; the icebergs, white on the surface, with mingled blue and emerald on their wild and jagged edges. The mountains are of misty purple and lavender hues, and their vivid reflections in the water are entrancingly beautiful.

How the steamer strains to force her huge bulk farther and farther into the dangerous mass of ice! Inch by inch she makes her way, in spite of warning notes and threatening appearances. The injury to the glacier caused by the earthquake of 1899 is now apparent; the once upright wall is changed to a surface sloping from its highest point to the water's edge. It now has the appearance of a vast cataract rushing madly into the bay, with great wings

spreading out on either side. It reaches the sea by a gateway, two miles and a half in width, between the spurs of two lofty mountains, and is surrounded by summits averaging from four thousand to six thousand feet above the sea. Its icy cliffs, a mile and three-quarters in length, rise from one hundred to two hundred and fifty feet above the bay, and extend nine hundred feet below its surface. It slopes backward to the mountains from ten to thirteen miles distant. Inexpressibly grand and awful is the appearance of this glacier! Thousands of crevasses and great fissures cross its jagged surface as it stretches away in its winding course between the steep mountain gorges. From its rugged surface great masses of ice are constantly falling into the water with a thundering crash that may be heard for miles. Our captain pushes the steamer on in spite of the increased pressure of the floes, until we are within four miles of the glacier, when he is compelled to yield to the superior force without. From the ship's bridge rings out the order, "Stop!" followed quickly by

the signal to turn about. It is an exciting moment. The icebergs press hard against the ship's sides, and creak ominously. The wheels turn, then stop, apparently wedged in the ice. Many, many attempts are made without effect. A slight thrill of alarm is felt among the passengers. "What is to be done?" is the murmur which passes from one to another. At this juncture several great icebergs, towering from thirty to forty feet above us, topple over with such a terrific sound that we feel as if we are being cannonaded. Vast showers of

spray rise almost to the top of the glacier, and now, one after another, bergs continue tumbling around us, while the steamer struggles to extricate herself from their icy grasp.

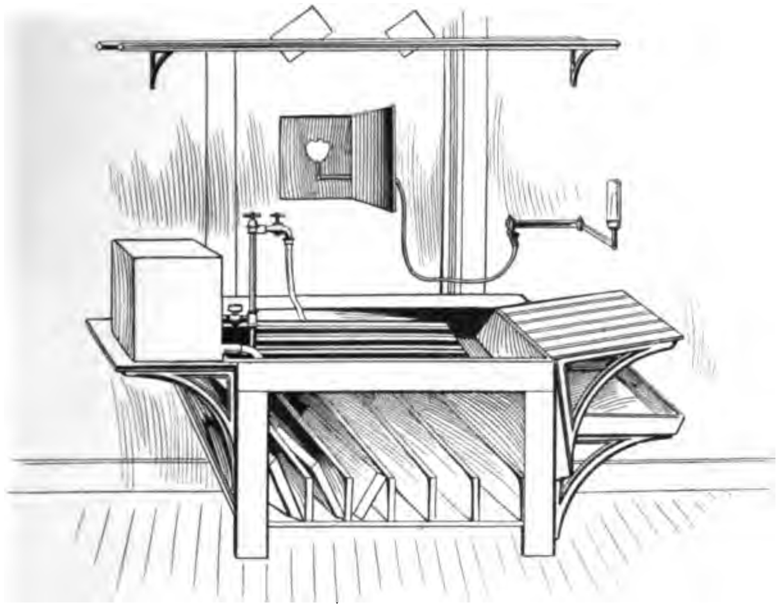
Determination on the side of the captain and the strenuous efforts of the crew are at length crowned with success, and slowly, slowly the vessel turns and begins to move gradually toward open water. We all breathe more freely, and I overhear the captain say: "Perhaps I went a bit too far into the ice jam."

CONVENIENT DARK-ROOM APPARATUS

By Robert E. M. Bain

THINKING it might interest your readers, I hand you herewith a sketch of the arrangement of sink and attachments, in use by myself for several years, and found to be most convenient for the purpose, the whole, save the sink and pipe work, being " home made."

The window, which is of the usual large size, has a shutter made solid, and hence is light tight. Into the lower half has been cut an opening 11 x 14 inches in size, to which is fitted a hinged frame con-



taining ruby glass, double (*i. e.,* two lights). Adjoining this window a gas bracket has been mounted so as to permit of attaching a gas hose inside, and having the light outside of the blind. This allows a full amount of light for night work in the dark-room, without the usual accompaniment of heat and odor of burned gas. White light is admitted by the simple process of opening the small window in the shutter. The shutter is thus available for either day or night use.

To the right of the sink the water pipe is brought up to about 15 inches higher than the top of the sink and has two faucets attached at right angles. The one is used for a water fan or other

use, while the other, having attached to it a rubber tube, rinses the plates after development. Just above the level of the window ledge is a T in the supply pipe, and from it is a small supply pipe carrying water to the washing box on the left. The overflow is an inch pipe at the other end of the box, which drains into the sink. An extension rack, placed inside the box, is intended for plate washing, so that various sizes may be used. The tank is about as long as the width of the sink, 14 inches high and 12 inches wide. Attached to the framework of the sink at its opposite end is the drain board, underneath which is an old silvering tray, 20 x 24 inches, used for fixing plates in.

Below the sink is a rack, holding all the necessary developing trays. High over the sink is the drying rack, mounted on two brackets, the plates on which drain into the washing box, sink or on to the drain board. This outfit has been in use for more than five years, and is so complete that it has not been altered since its introduction.

To those who have not the conveniences it offers it may serve as a suggestion in the right direction.

FOOTPRINTS OF THE WASHINGTONS

By Henry Erle Cooper

(Illustrations by the Author)

TWICE before I have attempted to give in the pages of the Annual some idea of the dwellings occupied long ago by the ancestors of Washington. "Great Brington and its Associations" was the theme of my last paper. I propose to close the subject by a very brief sketch of Sulgrave, a small "out of the world" village in the heart of Northamptonshire, and therefore in the center of England. About fourteen miles from the county town we find the home in which Lawrence Washington resided, who was the virtual founder of the Washington family, and who was twice Mayor of Northampton.

The river Tore takes its rise in this parish and a water-mill is supplied by the stream. The water-wheel is inside the mill and therefore out of sight. The stream is overgrown with weeds. The young miller is prevailed upon to sit down on the bank before the view is taken. We first indulge in a chat with him, and then stroll up the village street toward the Washington House, or Manor House as it was called. The exterior view gives us a quaint old dwelling in an excellent state of preservation. It is one of the few houses of two hundred years ago which has been taken care of, and it bids fair to stand for a long time to come.

Washington Manor House

Church Sulgrave

Astwell Castle

The interior is deeply interesting. The low-ceiled rooms, the massive oak staircase, the small leaded windows, enable us to recall

Old Cottage, Sulgrave

with ease the times when England's yoemen were the mainstay of the land. In the center of the village stands the church, with a

Watermill, Sulgrave

low tower containing five bells. Inside is one of the most precious relics of the Washingtons.

Near the altar, in the south aisle, is the tomb of Lawrence Washington. It is indicated by a stone slab, on which were originally six brasses. It is in a fairly good state of preservation. My limited space forbids further detail, but I must mention that so many American visitors now visit the homes of the Washingtons that the landlord of the George Hotel now runs a coach and four once a week in the summer months to Brington and round to Sulgrave, through some of the loveliest of our midland scenery. Within a short distance of Sulgrave is Astwell Castle. The remains are now used as a farmhouse, and near the castle is a stone and thatched cottage, standing in a landscape that would delight the knight of the camera.

STEREOSCOPIC PHOTOGRAPHY

By Robert E. M. Bain

THIS is an old and well-known method of photographic work and one which is familiar to a large number of practical amateurs.

With the advent of film cartridges and the new folding apparatus for taking double pictures, the interest will doubtless be increased, and a few words on the subject may not be amiss to the readers of The International Annual.

Conditions of selection of view are quite different from those prevailing in single picture work; for, to obtain the utmost stereoscopic effect, there must be prominent objects in the foreground and middle ground. These do not necessarily interfere with the pictorial effect, but, depth being the result of the relative position of the camera lenses with that of the eyes, the effect can best be obtained by placing objects so that the angle of view through the two lenses may be made as pronounced as possible. To obtain the idea it is only necessary to take a position which will cause some upright object, such as a tree, or something similar, to stand between the operator and the general landscape. By closing one eye and carefully noting the relation of the upright object to the background and afterward viewing the scene through the other eye, the position of the object in the middle ground will be found to bear a different relation to the landscape as seen through each eye separately. This is the relation which the two lenses bear to the two pictures, each of which is slightly different, and, when viewed through a stereoscope, the resulting picture is that seen by the normal vision of the two eyes, but by it one gains the impression of depth or perspective.

The prints from such negatives should be somewhat darker than

ordinary single pictures, but must have full detail, if an appearance of snow is to be avoided.

When printed, toned, and fixed (preferably both at once) the prints should be marked on the reverse with an R and L, to indicate the right and left hand views, marking them as they appear reversed, or as seen when viewed through the paper. After the pictures are ready for mounting, the picture marked R should be placed on the right hand side of the mount, when it will be found to have been the left hand picture as printed. Unless the prints are thus reversed in the mounting, the stereoscopic effect will not be obtainable.

As light and shade are important aids toward producing brilliancy in the pictures, it is advisable to take the shaded side of the landscape with sufficiently well lighted objects to make a brilliant view, with the sun somewhat in front of rather than behind the camera. It is a very difficult thing to get strong lights in a picture with the proper amount of detail, for they have a tendency to " burn black " in development, but with a great proportion of shadow full of detail, the result is apt to be better than if the reverse were the case.

Considerable care must be taken to have the camera level, as otherwise the pictures will not coincide and the greater portion of the view be lost in trimming.

The experience of the writer has shown him that the paper giving the greatest amount of detail gives the best results for this class of photography, and that sharpness is a great consideration in gaining brilliant effects.

For interior work a small diaphragm and very long exposure (to avoid black and whites) should be the rule. Stereoscopic photography is not specially adapted to portrait work, except groups, and, in making pictures of the latter kind, the subjects should be posed so as to avoid having the figures on a plane.

In developing films in warm weather it is the best plan to avoid " strip development," cutting the pictures apart in pairs and developing separately. Care should be taken to mark the prints as " rights " and " lefts " before cutting apart, as it is impossible to tell them apart after separation.

KEEPING QUALITIES OF MIXED SOLUTIONS

By H. Hands

I HAVE so often read that mixed photo-chemicals will "keep a few weeks only" that perhaps the following facts from my own experience may reassure those whose limited "dabbling" may often be the cause of made-up solutions being kept for considerable periods. In the summer I proceed to the hills (of India) and spend six months there, and six months at my place on the plains. For years I have been in the habit of leaving the various solutions on hand at each place when I go away, and resume their use on return. Mixed solutions of (1) soda carb. and soda sulphite, (2) acid solutions of pyro, (3) solution of sulphocyanide of ammonium, (4) hypo, (5) metol-hydroquinone, and (6) sensitized solution of albumen for the half-tone process. The effects of long keeping are as follows: As regards (1) and (3), no appreciable difference; (2) and (5), an increase of about 25 per cent. required in mixing developer for use, which means a slight loss of energy; (4) this seems to become slightly acid, but works us usual on addition of a small quantity of a mixed solution of soda carb. and sulphite, which prevents a slight bleaching of prints that resulted from the hypo used without it. (6) An increase equal to 20 per cent. in exposure seemed the only result of using this after long keeping.

Photographed by Edward Esmonde

Engraved by Electro Light Engraving Co., New York

Photographed and Copyright applied for By George Edmondson

A DINNER PARTY AT SENATOR HANNA'S DURING FIRST PRESIDENTIAL CAMPAIGN OF WILLIAM McKINLEY IN 1896.

Senator Hanna, Mrs. Merriam, Gen. Alger, Miss Phelps, Hon. Wm. R. Merriam, Mrs. McKinley, President McKinley, Miss Mabel Merriam, Mrs. Hanna, Miss Mary Barber

THE EVIL OF LAY COMPETITIONS

By Dr. John Nicol

BY "lay competitions" I mean those got up by newspapers and a certain class of magazines mainly for advertising purposes, and in some cases to secure at a cheap rate prints for reproductions in contradistinction to those inaugurated by photographic journals and those incident to photographic exhibitions, where the judges may be supposed to deal with the subject intelligently and have the right to withhold awards form the photographs that do not reach a certain standard.

While the benefit derived from the latter is questionable, and at some, indeed at most of our best exhibitions, competitions have been abandoned, there can be no question that the influence of the former is always for evil, and with them only I intend at present to deal.

It may be taken for granted that the newspapers and magazines that get up lay competitions have no connection with art, and that, as already said, their object is either to advertise themselves or to secure prints for reproduction, or it may be for both—conditions that render it unlikely that judges of any recognized artistic standard will be secured, the more especially as it is generally understood that the promised awards are to be made altogether irrespective of the quality of the exhibits.

It may equally be taken for granted that the competitors are confined to a certain class, or, to put it in another way, the progressive class, those who have learned to control the camera so as to make pictures, rather than let the camera control them, do not enter such competitions.

As a rule then, to which there are few exceptions, those who enter lay competitions are beginners or those who have not progressed beyond the mere record of fact or the craze for snapping, and whose technique leaves much to be desired. But with this the judges have nothing to do. Their duty is to award the prizes to, according to their judgment, the best photographs; and even where that judgment is correct, the prize taking prints are but the best of a poor lot; and one has only to examine some, yea, most of the reproductions of such "prize pictures," to see *how* poor such lots generally are.

And it is here that the evil comes in, here that the little knowledge is the dangerous thing. The young photographer knows enough to make what to the inexperienced seems "pretty," and what through friendly flattery he comes to consider really good. Off it goes to the first lay competition that he sees advertised, and in due course he is lifted to the seventh heaven by a notice of its having been awarded the first prize, which, although it probably cost less than a couple of dollars, stamps him, in his own opinion, a first-class photographer.

He had arrived at that stage when the criticism of a true friend who would show him his faults and how to obviate them might have put him on the road to real picture making, but he is far above that now, and contentedly rests on his oars and remains one of the great number of might-have-beens.

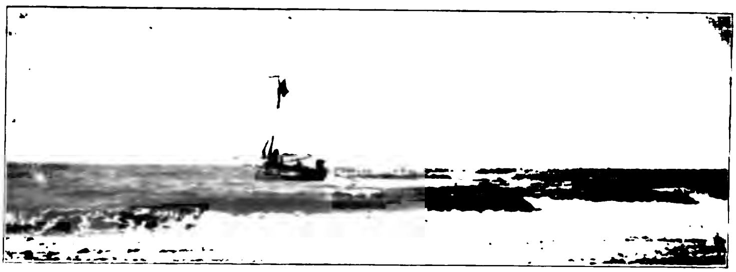
To the young photographer I would say eschew lay competitions and put not your trust in the flattering opinions of your friends. Seek out some one whose abilities as a picture maker by photography are recognized, and be guided by the advice that such men are always ready and willing to give. The more faults he finds the greater should be your gratitude, as you will the sooner be able to avoid them; and when you come to that stage that the longer you work the less satisfied you are, you may congratulate yourself on having got pretty far up the ladder that leads to fame.

A PHOTOGRAPHIC POINT OF VIEW

By James B. Carrington

(Illustrations by the Author)

THE camera as a recorder of literal truth is incomparable; as an instrument for giving us transcripts of things we call picturesque, however, it is always largely a compromise. But there is joy in half measures when we can't do better. One aspect of photography that always impresses you and fills you with envy is the ease with which travel-



Working off the Beach

ers find pictures that seem quite worth taking. Out of a dozen photographs taken amid familiar surroundings it is often difficult to choose one that departs enough from the commonplace to give us any unusual sensation of novelty or pleasure. The painter can sublimate the most familiar and sordid objects and eliminate lines that transgress the laws of composition. The photographer is hidebound. If he succeeds in securing a point of view that results in a beautiful picture he has often given more time and thought to it than would an ordinary landscape artist. A recent trip through Europe impressed

me forcibly with the great advantage one has in dealing with unfamiliar things. In rural England, France, or Holland it is not so much selection of view—you can go it blind and get something picturesque—but the moral courage to know when to stop. The landscape, the architecture, the costumes of the people, everything is different, and we all know what a large part novelty plays in what we call the picturesque. Of course, the discriminating eye will get more into his picture than the blind snapshotter; foreground, figures, etc., will be more or less arranged, but I have seen some almost perfect photographs by those who never gave a thought to anything but the pressing of the button.

It is certainly discouraging to the conscientious amateur at home to see how easy it is for the casual globe-trotter to take interesting photographs, but no right-minded camera user ever fails to realize how much better he would have done the same thing. The thatched houses of England, the Millet farm laborers of France, the dog teams

A Quiet Evening. Mid Ocean

of Belgium and Holland, together with the canals, windmills, and quaint costumes of " dear little Deutschland " make photography a joy forever and the things you bring home flattering to the pride you take in knowing the picturesque when you see it.

THE PERMANENCE OF NEGATIVES

By Chapman Jones

NOW that photographic methods are being so largely used in scientific work, and negatives are consequently being subjected to examination by scientific methods, the permanency of negatives that are used as records of facts has become a vital question. We know that some are not free from change, but we know exactly the lines to work on to secure

such freedom, and we believe that most, if not all, of the difficulty is due to a want of taking pains. There has been much nonsense written on the subject. We have heard of photographers looking over thousands of negatives, of ages up to ten or fifteen years, and concluding that because they saw nothing amiss it was an evidence of the permanency of their negatives. A general might as well ride through his army or along a row of recruits and, detecting no sick man, certify that every one was healthy. A change in a negative that would become disastrous from a scientific point of view in five years might go on for fifty years and not be discoverable by any such cursory examination. Then others tell us that they believe their gelatine negatives have changed, while their collodion negatives have not, but no one seems to have given any definite evidence on the matter. Collodion negatives were varnished; gelatine negatives, as a rule, are not. This is a difference in treatment that ought not to exist. Gelatine films, too, require much longer washing than collodion films, but they do not always get it, and it is not fair to compare a dirty gelatine film with a clean collodion film. Collodion was not given up in favor of gelatine for nothing, and we are not likely to go back to collodion. No one has yet shown that collodion negatives are superior in permanence to gelatine negatives, and there does not appear to be any reason why they should be.

It is unreasonable to blame a process because it gives faulty results when carelessly worked. We want some definite facts, facts that will bear careful examination, in order to discover the reason of the actual and the alleged alterations in negatives. So far, all the facts with which the writer is acquainted point rather to careless manipulation than to any inherent fault in gelatine negatives.

CHESTER

By Walter Sprange

ABOUT one-half of the visitors during the year to the ancient city of Chester in England are Americans. The principal reasons for this are that Chester, which is one of the most ancient cities in England, still maintains its air of antiquity, and is on the direct route by rail between Liverpool and London. It is only sixteen miles from Liverpool and, being a quiet and extremely clean place, those who can spare the time prefer to pass the first night off the steamship in one of its restful and well-managed hotels rather than remain in Liverpool, which is a very uninteresting place for strangers, always noisy, and its atmosphere usually smoke-begrimed.

Chester abounds in quaint and picturesque subjects for the amateur photographer, with the additional charm of the historical

Chester Cathedral

West Front, Chester Cathedral

or legendary reminiscences associated with them. After a week on shipboard, with usually nothing of interest to photograph, Chester is an excellent field for operations, and frequent visits to the dark-rooms of photographic supply stores for the purpose of changing plates is quite one of the customs there.

The older portion of the city, which contains most of the quaint or historical subjects, is within the ancient city walls, and, as they are only two miles square in extent, the amateur can dispense with a carriage, and make little trips to each section afoot.

Those who can do so should arrange to pass a Sunday in Chester in order to attend services in the Cathedral, at which the rendering of the musical portions is simply exquisite. The evening service is

The Abbey Court

followed by organ recitals by Dr. Bridges, the well-known composer of sacred music.

The present cathedral was erected by Hugh Lupus, Earl of Chester, in the reign of William Rufus, who was shot in the New Forest in the year 1100. The cathedral was occupied by a colony of Benedictine monks until the dissolution of monasteries by Henry VIII., who created it the cathedral church of Chester, one of the six new bishoprics established at that time.

The exterior of the cathedral is remarkable for its lofty flying buttresses, crocketed pinnacles, and the rich coloring of its red sandstone. The most beautiful portions of the interior are the choir and

Watergate Street

the oak screen which divides it from the nave. Both are the work of Sir Gilbert Scott, who also restored the rest of the cathedral.

The Cloisters, the Lady Chapel, the Chapter House, and the Abbey Court are all worthy of an exposure, and require care and study to make successful negatives.

Permission to photograph in the interior of the Cathedral must be obtained of the Dean, who only grants permission to photograph betwen the hours of service. When possible, time exposures should be given the interior views, by placing the camera on some solid base, and, after focusing on objects in mid-distance, stopping down the lens to the smallest aperture before making the exposure.

The Ancient Roman Wall

Watergate Street and Bridge Street are the two most ancient thoroughfares, and both are noted for their quaint buildings with curious façades and decorated gable ends. Another peculiar feature is the arrangement of the sidewalks of the buildings, called rows, in which are the principal stores, with the upper floors projecting, forming a continuous line of piazzas.

The ancient Roman Wall, which surrounds the original settlement of the town by the Romans, can best be photographed from the old Dee Bridge. This wall is the favorite promenade of visitors because it leads to many objects of interest and affords such excellent views of most of them. At one angle of the wall is the Phœnix Tower, from which King Charles I. overlooked the defeat of his army on Rowton Moor in 1645. At another angle is Bonewaldesthorne's Tower, in the upper portion of which is a

The Old Dee Bridge


Ruins of the Chancel, St. John's


The West Tower, St. John's


The Anchorite's Cell

camera-obscura. Below this is the Water Tower, erected in 1322, at which period the tidal waters of the river Dee flowed up to it. Beyond this, to the south, is the old Linen Hall, formerly the most important mart for the sale of Irish linens, but now used as a market for the sale of the celebrated Cheshire cheese.

The old Dee Bridge, with its seven arches, was erected in 1280, and has always been an object of interest for its picturesque location. Before the rise of Liverpool to prominence, Chester was one of the most important ports on the west coast of England, and had the greater portion of the Irish trade, but since the silting up of the river Dee, and the consequent transference of trade to Liverpool, Chester only receives a few coasting vessels.

The ruins of the ancient Church of St. John, in Grosvenor Park, just outside the city walls, have suffered severely in recent years from the crumbling of the cement in its masonry. So much so that some of the upper portions have had to be taken down, but still the ruins cover considerable ground, and offer many interesting views for negatives. The chancel is noted for its beautiful Norman arches, and the West Tower for its substantial construction.

On the slope between these ruins and the river Dee is the Anchorite's Cell, in which King Harold II. is said to have taken refuge after the battle of Hastings, and to have lived the life of a hermit; but the legend is mere romance. King Harold's body was buried in the rocks at Hastings, and afterward removed to Waltham, his native place.

There are few rivers in England to compare with the Dee for the beauty of its scenery above Chester. Six miles up the winding river is Eaton Hall, the magnificent country seat of the Duke of Westminster. For a small fee visitors can be conveyed there by boat. The drive to Eaton Hall over the most direct road is only four miles. Hawarden, in Wales, the home of the late Mr. Gladstone, is only two miles from Eaton Hall, through the Duke of Westminster's private grounds—one of the best preserved and most charming estates in the world.

PHOTOGRAPHY APPLIED TO SURVEYS MADE BY THE LANDSCAPE GARDENER

By J. A. Flemer

GRADING the terrene surface to provide proper drainage for lawns and road systems, as well as the laying out of road courses and lines of paths, require judgment, experience, and some study.

The general theoretical principles which underlie the constructive work of the landscape architect and gardener are the same, no matter where the field of his labors may be, but the decora-

tive part of the work will naturally differ, inasmuch as the selection of the varieties of plants may greatly vary for different sections of the same country.

Before any decorative plantings are made, however, some working plan should be at hand showing not only the prospective groupings and individual plants, but embodying also such plants already growing that are to be retained, as well as all necessary constructive changes, and to produce such plans the photo-topographic surveying method is of much value.

Even for a general orientation and for preliminary studies, photographs of the unimproved estate, taken from different stations or points of view, will be very helpful to show the actual effect of the proposed improvements which may be sketched (in perspective) on these photographs.

Such composite perspectives will convey the ideas of the professional landscape architect or gardener to the mind of the owner of the estate far better than a ground plan or a map alone, as it requires a more or less trained eye to mentally convert certain parts of a ground plan into perspective (or into a picture), as they would appear in combination with the general surroundings when viewed from any given point on the plan.

Generally speaking, the plane-table method has given the best results for planning improvements to be made by the landscape architect. In photo-topography, the same general methods are followed as in plane-tabling, with the exception that the actual plotting is done in the office instead of in the field, and that a series of photographic panoramas are obtained showing the country as it appears from a number of given stations.

The photo-topographic ("iconometric") draftsman studies the photographic perspectives of the terrene that is to be mapped in a manner analogous to that in which the plane-tabler subjects the landscape to a critical inspection to grasp its salient and characteristic features to be conventionally represented on the map.

It may be well to recall to mind that topographic maps are primarily graphic records of instrumental measurements made in the field for the location of salient features of the terrene. Photo-topographic mapping is likewise a graphic art, based upon graphic or pictorial records; instrumental observations, together with the needed computations, being required only to furnish such elements as may be needed to make the graphic transpositions, to convert the perspectives into orthogonal projections or plans, and to secure a proper control for the work in its entirety.

The lines of direction to characteristic terrene points, identified on different panoramic views, are found by transposing linear measurements made on the photographic perspectives, which, together with the constants of the surveying camera, will enable the iconometric draftsman to graphically locate and plot the identified points as intersections of their corresponding lines of direction. If the

Engraved by
Electric City Engraving Co.,
Buffalo, N. Y.

By Oliver Greenway

ON THE HILLSIDE

bearing from the camera-station to any well-defined pictured point be known or plotted, the line of direction from the plotted camera-station to any other point on the panoramic view may be plotted iconometrically.

The photo-topographic surveying method is peculiarly well adapted to subserve the needs and requirements of the landscape gardener, especially when making several designs showing different treatments of the same place, for a better representation of modifications and diversification in economic and scenic effects when preserving more or less of the plants already standing, for comparison of results, obtained from more or less grading and remodeling of the surface, etc.

After completion of the field work of a photo-topographic survey, the landscape architect may make any number of preliminary plots at leisure in the office, by plotting such points only which control the proper development of the terrene forms coming into consideration for each particular scheme. Such preliminary maps need show such artificial and cultural details only as are to be incorporated into the particular design the map may illustrate. After a decision has been made which of the different schemes under consideration is to be adopted, a more detailed and accurate plan may be plotted, on a larger scale if desirable, using only the field records of the original survey, without having to return to the ground for making additional and supplemental measurements, as is so often the case when applying the ordinary surveying methods where the plotting is based on field notes. If the camera-stations were well chosen, a full control of the terrene will be assured, and all data required for either a preliminary plot or for a minute and detailed map are garnered in the panoramic views, whence they may be assembled by the iconometric draftsman.

It may be stated that well-selected plane-table stations for a given area will also be good camera-stations. Camera-stations should be sufficiently close together to give a full control of the area to be surveyed, or, in other words, the stations should be so disposed that any point which is to be plotted may be identified on three or more photographic panoramas, and these panoramic views should be placed in such manner that the point may be located on the map as the intersection of three or more lines of direction, two of which should form an angle of intersection of about ninety degrees—at least not less than sixty degrees.

BLUE TONES ON PLATINUM

By Joseph F. Smith, M.D.

(Illustration by the Author)

VERY pretty moonlight effects can be obtained with platinum paper by using a developer containing ferricyanide of potassium. The following will be found to be a good working formula, and can be modified at will to secure various tones:

Oxalate solution (1 : 3)	1	ounce.
Ferricyanide of potassium, 10% solution	3	drams.
Glycerine	2	ounces.
Water	4	"

The paper should be printed rather deeply and the brush method of development gives greatest uniformity of development and freedom from streaks and stains. When developed, the prints have a greenish tone, which quickly changes in the acid bath to a blue not unlike that of "blue print" paper. The acid bath should be

The Stoker

one-half the strength of that usually used for platinotype and prints should be left in the bath only long enough to clear the whites.

With negatives giving strong contrasts the deeper shadows develop black with the above solution, while the lighter portions of the print take the blue tone. Thus a two-color print can be obtained which materially increases the " moonlight " effect.

PHOTOGRAPHING OLD PEOPLE

By Gustine L. Hurd

Of course it is axiomatic that the first office of a picture (a portrait) is to be a likeness, and however much this self-evident truth has been lost sight of in these later years, since the desolation of retouching has darkened the land and photographers have lent their efforts to catering to the vanity of females of both sexes, the cardinal reason for making portraits at all remains as in the beginning.

All persons, of whatever age or condition, are interesting (if they are clean) to one who has a talent for likeness-making, but to me old people have a peculiar interest as subjects. Babies and very young children afford a kind of whimsical grotesqueness in their efforts to get the hang of life; the young man and woman in their gathering strength and charm furnish fine studies; the middle-aged, who have developed all their powers and are in the midst of the battle of life, call for serious and thoughtful work; but the old, who are emerging from the thick of the fray, bearing upon their faces and in their air a record of the experiences that have come to them, set against a background of racial lineaments, form a class at once distinctive and unique, and are perhaps the most difficult to manage. In the first place, the old person often feels that the fact that he is old demands an apology, or at least an explanation, to account for the folly he commits in having a picture made. He seems to feel that there is no beauty but the beauty of youth, and that the furrows of his cheek and the wrinkles of his brow are something for his younger family friends to be ashamed of. Hence it is very difficult, if you would please your sitter, to exercise that temperance in retouching that a successful portrait calls for. I remember an old lady who came to me and placed quite an order. She impressed me as a most beautiful old lady: her hair was still abundant and evenly turned to white, her face was a perfect network of soft lines (you could hardly call them wrinkles), and her expression was one of great refinement and sweetness. I secured one negative that I thought was ideal, and her pictures were made from it. It was retouched little if any; it was so soft and delicate that a retoucher's work would seem like

a bull in a china shop. Some time after I saw her and found that her photographs were but indifferently satisfactory. She told me that she had a sister whose face bore more of the marks of age than her own, and that her pictures (by another photographer) did not show a trace of them. There you are with the average old person, especially if it is a woman; but there is compensation in the fact that a good, faithful likeness is sure to please the friends of the sitter, and, moreover, a sense of duty performed in sending down to their posterity a true portrait of their relative in his or her old age. Such pictures are very interesting to the family in later years. But there are some things to be observed if we are to secure a good portrait. In the first place, they should never be disposed of hurriedly. They come a little sensitive about their old faces and somewhat geared-up at the thought of sitting. Take time to have some conversation with them, and establish, if possible, a feeling of familiarity and sympathy; make them feel that you are interested to get something that is really good, and that it is not wholly a matter of business with you. Characteristic attitudes count for much more in the way of likeness than with younger people, and for that reason it seems to me that a half-length or full figure is better than a bust in many cases. Then comes the question of accessories, which should be something not out of line with the apparent condition in life of the sitter. Sumptuous furniture and stately interiors are a mockery and an absurdity when your subject is a plainly dressed old person of the humbler class. A chair that suggests the comfort that old age requires often adds much, but, what is better still, is the chair they are accustomed to sit in at home. I have sometimes been asked if their home chair might not be sent in for the purpose, and the idea is a good one. The nearer we can get to chimney-corner effects the better. For that reason sittings made at their homes, where some familiar objects can be included, are of especial value. True, we may not be able to achieve as fine effects in lighting, or find our accessories to give the balance of light and shade we desire, or to please us entirely in the matter of composition, but the home sentiment will outweigh them all. In not many cases, perhaps, will these home sittings be had, for various reasons, particularly the increased expense, and we must fall back upon such things as we have under our skylight. When we find that we have nothing that accords with the personality of the sitter, it is better to employ a perfectly plain ground that will give proper relief to the subject, and at all events not detract from the likeness by dragging in elements that are foreign. The two-thirds length of the old man on opposite page will illustrate what I am trying to say. I think it will be agreed that a bust would not have expressed him as well, and that any accessory effect would hardly leave the interest in the figure so well centered.

I am convinced, too, as I have explained before, that in the

Photographed by G. L. Hurd

case of old persons a prolonged exposure is better than a short one, for the reason that the tense muscles with which the sitting commenced will relax, and several expressions, perhaps, will flit over the face before its close, the blending of which will almost always secure a better expression than a short exposure.

OLD ENGLISH HOMES

By James Gale

(Illustrations by the Author)

SCATTERED here and there throughout our beautiful land, sometimes hidden away in some remote spot far from the feverish unrest of our times, sometimes in some dear, sleepy Old World village, and less often near a large town, are still to be found many examples of the charmingly picturesque old buildings handed down to us as a heritage from the sixteenth and seventeenth centuries.

And a glorious heritage these delightful old homes are in truth, so well in keeping with the soft greenery of the English landscape and the gentle sunshine of its unjustly abused climate. What a picture the photographer can make of them, for they are always pleasing features in themselves as well as in the landscape.

So genuinely English, with their many gables, clustering chimneys, high-pitched roofs, mullioned windows, turrets, and quaint conceits. Unlike classic buildings, they are not ashamed of roof or chimney; they acknowledge rain and snow, the necessity of fires, and make a beauty of the obligation. They are essentially the homes of the old English people from prince to peasant, that in this stirring twentieth century appear more like a poet's or painter's conception than a reality.

But, alas! as the years roll on they are becoming more scarce to find; one by one they are only too surely disappearing. Now it is by fire that one is lost, for the timber is old and dry, and a spark is soon wafted into a flame that leaves hardly a vestige to mark its site. And again it is man's ruthless hand that destroys one of these precious heirlooms. Built before the luxury of the present day was thought of, they do not come up to the requirements of this twentieth century in their internal fittings and arrangements, and so they are ruthlessly swept away, to make room for a building probably more hygienic, but certainly not half so picturesque or poetic. Yes, these old architects built poems; to-day our best is but dull prose.

And so it comes about that I am placing before you some few choice specimens of our ancient domestic architecture culled from a collection of several hundred negatives, made during the past twenty years, and in doing so it is my endeavor to describe little-known places rather than well-known ones, half if not wholly forgotten, now that so few care to explore the byways of this land.

Perhaps the most unique and quaint of all our ancient homes is one situated in the heart of Shropshire, and known as Stokesay Castle, though it is more a fortified manor house than a castle. Standing as it does in a lovely valley with its background of far-stretching fir-clad hills, it makes a scene to delight the heart of a poet or painter, a romance in stone and timber, a picture rather than a place. Stokesay Castle is one of those perfectly beautiful spots that seem almost unreal because so beautiful. Moreover, it is set in the heart of a lovely country, and the setting is worthy of the gem.

The various parts of the building date from different times, the oldest being the fine Baronial Hall, which was built by John de Verdon in 1240. This contains a magnificent and well-preserved roof of open timber-work, and is lighted by a series of Gothic windows, some looking over the moat and some over the courtyard. The original staircase with steps of solid blocks of oak occupies one end of the hall, and leads to an apartment called the priest's chamber.

In 1290 it was held by Lawrence de Ludlow, who obtained permission to fortify the mansion and who erected the South Tower.

During the Civil War the castle was garrisoned for the King, but surrendered to the Parliamentary forces.

The latest part of the building is the Gatehouse, built in the sixteenth century. This is a beautiful little structure of half-timbered work, in many parts richly carved.

Engraved by
Scientific Engraving Co.,
New York

By B. J. Falk

Anything more picturesquely peaceful than this relic of the warlike past I can not imagine. Within its time-rent walls the harmless daisy grows and the artist paints in a tranquillity undisturbed.

Another fine old mansion of a different type is Moreton Hall, in the county of Chester. The ancient walls of this delightful abode are time-tinted and mellowed into a harmony of soft colors. There is no painter like Time, though he may take two centuries or more to perfect his work. A lofty gable of oak and plaster-work, with great windows, overhangs the entrance gateway, which admits to the courtyard. Entering, we are surrounded by fresh beauties. Nothing can exceed the wonderful effect of the north side of the courtyard. The windows are many and large. Where there is no glass there

is dark oak, richly carved, or molded into quatrefoils and other forms, filled in with plaster. Two of the bays, two stories high, are each formed of five sides of a decagon, differing in size, and surmounted by gables. The upper windows overhang the lower, and the leadwork holding the glass is formed into various geometrical patterns. Above these beautiful windows there is an inscription, which reads thus: " God is al in al thing. This windows whire made by William Moreton in the yeare of oure Lorde MDLII. Rychard Dale, carpeder, made theis by the Grac of God."

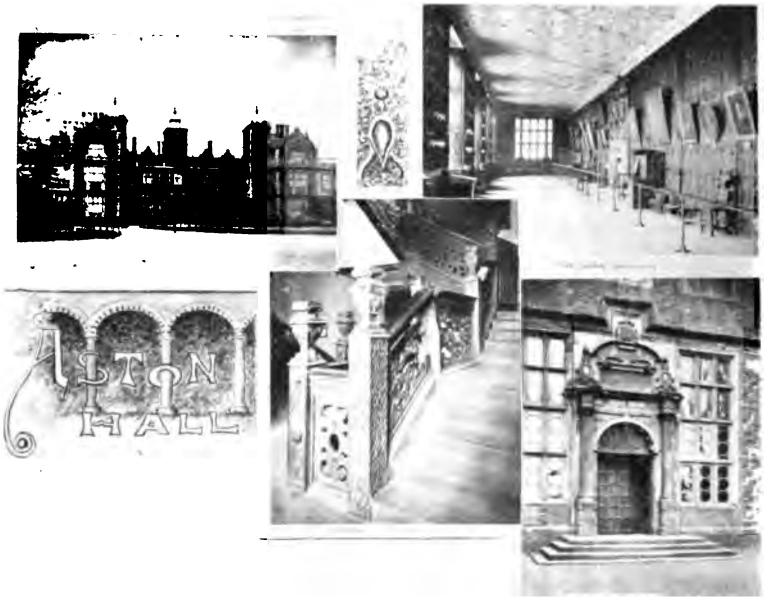
At the top of the Gatehouse is the ballroom, the open timber roof of which is very beautifully ornamented with oak and plaster quatrefoils. One end and the whole length of each side of the room is a

continuous line of windows, the leadwork of which is formed into a marvelous variety of patterns.

The Manor of Moreton was held by knight service, and gave its name to the family who held it.

From the reign of Henry III. the estate continued in that male descent until the year 1763. William Moreton, born a year after the accession of Henry VIII. to the throne, began the erection of this charming building, and his son, John Moreton, who died about the end of Elizabeth's reign, completed it.

Such is the short description of this architectural picture, a romance in building such as one would only expect to find in a paint-



ing, or described in a novel, and not actually existing in these present prosaic times.

Another fine old mansion, considerably later in date and built with different materials, is the rich old red-brick building of Aston Hall, situate near the city of Birmingham.

Erected 1618-1635 by the head of an ancient and wealthy family, this, of the many "stately homes of England," has survived the beating of the storms of two hundred and fifty winters better than most, thanks to the care of the corporation of Birmingham, to whom it now belongs.

The Hall itself stands on a slightly rising eminence, and at the first glance impresses one as testifying to the grandeur and princely

tastes of its founder. Few more stately fronts are to be found among the great houses of that period than the time-worn façade of Aston Hall.

Built by Sir Thomas Holte, famous for his loyalty to the Stuarts, he had the honor, in 1642, of entertaining Charles I. here. In the following year the Hall was besieged by the Parliamentary army. The old baronet, much against his will, had to surrender after a loss of twelve of his comrades. The marks of the cannonading are still visible in the walls, and the interior of the Hall suffered no little damage, as may still be seen on the first-floor landing of the grand staircase. One heavy cannon-ball, after passing through two thick walls, struck the massive oak newel of the balustrade, splitting and rending it from top to bottom. This shattered newel and broken paneling remain as they were left after the fighting.

The Great Gallery is a noble apartment, one hundred and thirty-six feet in length. The walls are covered from end to end with the

finest oak paneling. The ceiling of this room is of remarkable and elaborate design, highly typical of the period, in which the oft-recurring cornucopia plays a conspicuous part.

How is it that an English home like this charms one with its picturesqueness, while most modern ones, when they do not actually offend our eyes, are so uninteresting? It is surely because the men of the past built their homes to live in, not to sell.

Just one more group of historical old houses and I have finished.

An old hunting-lodge of the Giffard family, on the borders of Staffordshire, is brought into prominence by the fact of its being a secure hiding-place of the ill-fated Charles II. in his escape from the battle of Worcester, in 1651. It seems that hardly any house of importance in those days was unprovided with a regular hiding-place. The architects of the time would as soon have thought of omitting a kitchen in their plan as these secret chambers or " holes "

of concealment. The one at this old house of Boscobel (meaning Fair Wood) is built in the chimney, and admittance is gained by a paneled door in the bedroom. A trap-door in the floor leads by a postern stair to the garden, giving a means of egress to one whose hiding-place has been discovered.

This, though a small house, is an interesting one, and contains some good oak paneling. A few miles away stood another house to which Charles went after leaving Boscobel.

Moseley Hall was one of those quaint black-and-white timber houses that always make a picture. It is now, alas! only a commonplace brick structure, having been modernized some years ago.

Oh, the charm of these old houses! What an individuality they possess; what a feeling of domestic abiding they give, of restful quietude—a happy combination of stateliness and homeliness! How free they are from formal monotony or showy ostentation! They have, too, the rare merit of simple dignity.

Picturesqueness is their birthright, but this has come naturally. Doubtless, to a severe classical critic, they are far from being architecturally perfect; purposeful symmetry is no part of their plan; their very shortcomings in this respect constitute their special charm—they are so delightfully irregular.

These old Tudor and Elizabethan houses are unique. They are true natives of the soil, not copies of the architecture of other lands, an original and perfectly picturesque style, the expression of the artistic feelings of the Englishmen of those spacious times. Yes, these old architects built for time, and their work may be called poems; to-day our best is but dull prose.

WORKING THE AMATEUR

By C. M. Giles

THERE is a class of publishers which seems to think that the amateur photographer is legitimate game and that all that is necessary to get prints from his (or her) best negatives is to tickle his (or more likely her) vanity by giving an opportunity for them to see their work in print over their names. Or else the plan is to have a competition, so-called, with prizes for the best print offered, and all the rest "free for nothing," as the boy said.

Now the point I wish to make is that any print that is worth using by a reputable periodical is worth to the publisher a fair price, no matter under what circumstances it was made, and the fact that it is the work of an amateur, who made the negative primarily for his or her own pleasure, need have no part in the settling of the price paid for the print. Amateurs, even the merest tyros in the work, need have no hesitation in asking a fair rate for their work if it is worthy of publication. And if it has real merit,

especially if it is timely and illustrates some feature of the news of the day which is at the time prominent, it should command a fair price. Just what that price will be must of course vary with circumstances, ranging all the way from $2 per print to $10, or even more for exceptional work. It would probably prove interesting, and possibly advantageous, to the amateurs in general if a discussion of the price question by amateurs of some experience could be arranged. Perhaps even the professionals, in self-defense, would join in and help out in the discussion. I leave the hint with the rest of the fraternity for them to work out.

CARBON PRINTING

By Robert J. Hillier, L.R.C.P., London, M.R.C.S., Eng.

TO those who have used the carbon process it is most astonishing that more amateurs do not work it. It seems quite inexplicable that a process capable of giving such lovely and such permanent results should not be popular everywhere. Yet, such is undoubtedly not the case, and I believe the whole cause of this want of use lies in misapprehension of the ease of working it. Let us consider the disadvantages and advantages of the process, and I quite believe that any thoughtful photographer will at once see that the former are so small as to be practically negligible. In the first place, the accusation against the process generally advanced is that it is too difficult for amateurs. Well, of course, if an amateur can not use a very simple actinometer (and even this may be dispensed with, as I hope to show further on), can not use a squeegee and can not use the most ordinary care, it is too difficult; but these three necessaries are all that are required for the production of the most beautiful prints that any process is capable of giving. While on this particular subject it may be well to point out what I believe to be a possible source of this idea of difficulty in working. I have several times been struck by the way the process is described in the handbooks on the subject. The simple methods of work are too much obscured by directions for combating all sorts of errors which in many cases the worker would not meet with, the consequence being that the amateur is completely lost in contemplating the numerous pitfalls into which he may fall and their remedies, and loses sight of the extremely easy steps of the actual process. To my mind it would be far better, not only in directions for carbon printing, but in many other photographic processes, if the directions given at first merely referred to a normal print or negative, and defects and their remedies were treated of separately. The next cause of worry for amateurs in carbon work is as to the chemicals required. Their fears on this question are easily enough allayed when they realize the fact that the only

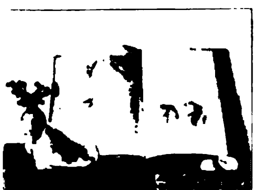
one required, unless they sensitize their own paper, is ordinary alum, and that the process proper is worked solely by the proper application of hot or cold water. As to apparatus, an actinometer is generally considered a necessity, but it is a well-known fact among photographers that the time taken in printing to the ordinary tint a negative of the same density on ordinary gelatine printing-out paper is quite a reliable guide to exposure. Absolutely no other apparatus but what any amateur would already have is necessary. Ordinary washstand basins do most excellently for developing in, and for alum one dish is needed. Can anything be more simple? Now with regard to keeping the tissue when sensitized. When bought from the makers (and they are always ready to supply it in small quantities, such as a dozen cut pieces) it will keep quite a fortnight, and a writer* in *Photography* of the current year says that it will remain sensitive for three months if kept under pressure in a box containing calcium chloride if it be exposed to damp air (in the dark, of course) for a short time before printing. But supposing the amateur wishes to sensitize the tissue for himself, there is really nothing to be afraid of. It is only requisite that the cut sheets of tissue should be immersed in the bichromate solution for the requisite time, then squeegeed on to a ferrotype plate (they are not sensitive to light while wet) and dried in the dark, when they can be peeled off the plate and are ready for use. Even the trouble of sensitizing has been greatly simplified lately by the introduction by Messrs. Burroughs, Wellcome & Co., the well-known druggists, of tabloids of the sensitizing salts, which immediately, on solution in a definite quantity of water, give the necessary strength sensitizer. Another objection frequently raised is the reversal of the picture as regards the left and right hand sides, and this in some views and architectural subjects is at first sight a grave objection. Even this, however, may be very easily overcome. The easiest way, of course, is by using film negatives, which can be printed from either side; but in case the soul of the operator yearns for glass plates, the difficulty is easily met by double transfer, which is an infinitely easier proceeding than it reads on paper, and in practise is one which for difficulty the average amateur would sneer at. Having gone over lightly all the principal disadvantages, it would, perhaps, be well to enumerate the very weighty advantages of the carbon process. The first is absolute permanency of the print. This is acknowledged as beyond all question by every authority. Secondly, certainty as to the color of the resulting print. I believe this process is the only one that can lay claim to this quality. Thirdly, the beauty of the surface of the print. Any surface can be secured, according to the variety of the paper on which the transfer may be made, from very rough to the hideous gloss of a squeegeed gelatine print. Fourthly, no loss of detail in the minute parts of the picture, such as sometimes occurs in platinum and other matt surface processes. Fifthly, great economy of chemicals, alum being the only one used,

unless the worker does his own sensitizing, when he will require some potassium bichromate, which is almost as inexpensive as the alum. Sixthly, rapidity of producing prints, and this considerably outdistances most other processes on account of the very short washing required; in fact, a rinse under the tap is all that is necessary. Seventhly, the ability to transfer the picture to other surfaces than paper, such as glass for transparencies, or ivory or opal for miniatures, etc. Eighthly, the ease of correcting very considerable errors in exposure by various means, such as keeping the exposed tissue for a few days in cases of underexposure before developing it, and also the use of hotter or colder water in development. Blemishes in prints, too, are so very easily managed. The pigments used in the tissues are now procurable in water-color form, and any one who can use a paint brush can do a great deal to rectify spots, etc., which may appear on the print. It may also be worth mentioning that a carbon print can be very considerably modified if too dark in parts by the use of an ordinary piece of india-rubber; in fact, it is quite possible for any one to work in clouds on a print by this means. I think I must have shown sufficient reason for this, the most beautiful photographic printing process, being more used by amateurs, and the more it is used and known by some, the more I am convinced it will continue to gain ground with others.

SHELLS AND SHELL PHOTOGRAPHY

By Dr. R. W. Shufeldt, C.M.Z.S.

(Illustrations by the Author)



INCIDENTALLY and in other places I have published accounts of my experiences in the matter of the scientific photography of shells. Since those articles have appeared, however, some two or three years since, I have improved upon my former methods, and the results are now more satisfactory. This increased success I find in a measure due to the kind of dry plate I have been using. After numerous comparative experiments it became clear that there was no dry plate in the American market that could equal for this purpose the Cramer plates—that is, his isochromatics. In employing these, the instantaneous ones have always been selected. They give fine color definition, and the glass is wonderfully free from bubbles and other imperfections. Exactly why it is I can not say, but my best results have come from using a slow lens, the quickest plate, and the smallest diaphragm, rather than the reverse of all these factors.

Fig. 1. *Tent, or Panama, Shell*

It has already been shown elsewhere that the best method of photographing shells is to attach them, by means of wax, to a perfectly clear pane of glass, back of which, at a distance of eighteen inches or so, there is placed the background to be used. This may be dead black, pure white, or some of the buff, grays, or yellows, depending upon the effect that is desired to be produced. Of course, very minute shells are not suitable subjects to be photographed in this way upon glass, any more than are the great ponderous forms we sometimes meet with in collections or in our collecting. The large white shells shown in Fig. 3 were placed upon a shelf, at the height of the camera tripod, and a background made by the use of a piece of dead black cambric. This kind of treatment throws these large white shells into fine relief, and their forms and characters can to a great extent be studied in the photographs. Sometimes I have made pictures of shells by not using any glass support at all, but have merely placed them upon a piece of rock, and slipped behind them some little chromo picture or other of a marine scene, as shown in Fig. 6, and there are those who are pleased with the results thus obtained.

Fig. 2. Bishop's Mitre Shell

As I have so often said, the great difficulty met with in photographing many kinds of shells is to get rid of the presence of brilliant areas and lines in the subjects, and thus not have them appear as white patches and stripes in the pictures. If properly handled, however, these latter are not always objectionable, for they may show exactly what appears in nature, and, moreover, express the fact of the shininess of the object. The dead white Mitre shell shown in Fig. 2 exhibits none of these reflections, while they are seen in the highly iridescent Ear shell (Fig. 5), and on the Tent, or Panama, shell in Fig. 1. A wonderful effect is produced in the larger of

the two shells shown in Fig. 4. As usually met with in the shops, it is a wonderfully pearly, iridescent object, and this very effect almost seems to have been reproduced in the photograph. The companion shell in the same picture—a small Harp shell—was so placed as not to show any reflections or brilliant areas of light at all, and so we have a perfect representation of this elegant species, seen upon its apertural side.

Passing now to the general study of this subject, it has always seemed to me that of all the various departments of natural history there is no single one that possesses any greater interest for the scientist, nor one that presents in its study any more attractive field for the tyro in biology, than does that of the mollusca as a whole. Researches in this branch, be it remembered, call for a consideration of all those creatures commonly known as mollusks, and these include such a familiar class of animals as oysters, mussels, snails, clams, cockles, and innumerable other forms which in the vast

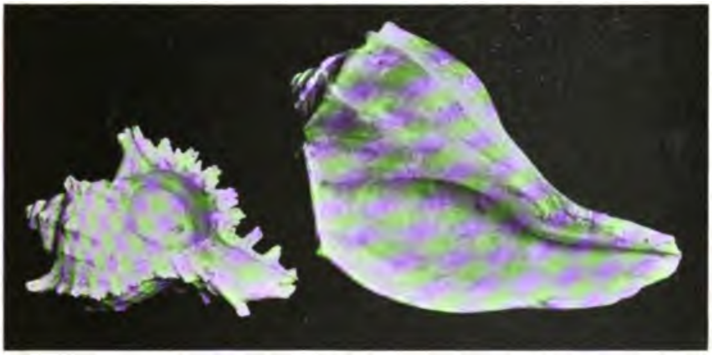


Fig. 3. Shell with Dextral and Sinistral Aperture

majority of instances produce during their growth those structures we designate as *shells,* or those objects in nature I have just been writing about the photography of in the leading paragraphs of this article.

Now, although a molluscan animal and its shell are part and parcel of the same organism, it is the latter that has the greatest fascination for the popular mind and the popular eye, and very naturally so.

There are many thousands of different kinds of shells now known to science, perhaps as many as twenty-five thousand, found in existing mollusks, and fully twenty thousand more which represent the fossil species known, and that are now extinct.

No series of structures in the entire realm of nature possess any higher claim to beauty, and to marvelous diversification, than do the shells of most all types of existing mollusks. To be sure, the shells of some of these creatures, as those of the common oyster or the

clam, can hardly be considered as objects of great beauty; still, as we pass to those of the majority, we meet with forms which almost defy the powers of language to adequately describe or the skill of the colorist to portray. They are found nearly all over the world: in the sea, on the land, and in river, lake, and pond. They have been studied and collected for time immemorial; they constitute the objects of love and passion to the inveterate conchologist; while artisans of all ages have cut from certain species cameos of surpassing beauty and other designs. Other species in many savage countries have long been employed as money in trade, and in recent time, among civilized people, enormous industries have grown up, devoted to the manufacture of common pearl buttons, the cheaper forms of jewelry, and many similar things of every-day use and occurrence, all being made from shells of certain species which are gathered in immense quantities for such purposes. Thousands of people are and have been

Fig. 5. Ear Shell, or Abalone, from New Zealand

employed in collecting shells in various quarters of the globe for public museums or for the market, or for the cabinets of professional and amateur students of the science of conchology. An equal number are engaged in the preparation of shells for distribution in these various channels. For, be it known, many shells when taken in their natural habitats do not appear as they do subsequently when purchased from the dealers. In the case of any individual shell the living animal to which it belongs has, of course, to be completely removed. Then, again, the outside or exposed surface of many varieties of shells is covered during life with a layer or coating of a limy or calcareous deposit, which, by various processes, must be entirely gotten rid of before the specimen in any case exhibits all the characters of its iridescent beauty that it has in the cabinet or market individual. After being submitted to such treatment the shell is

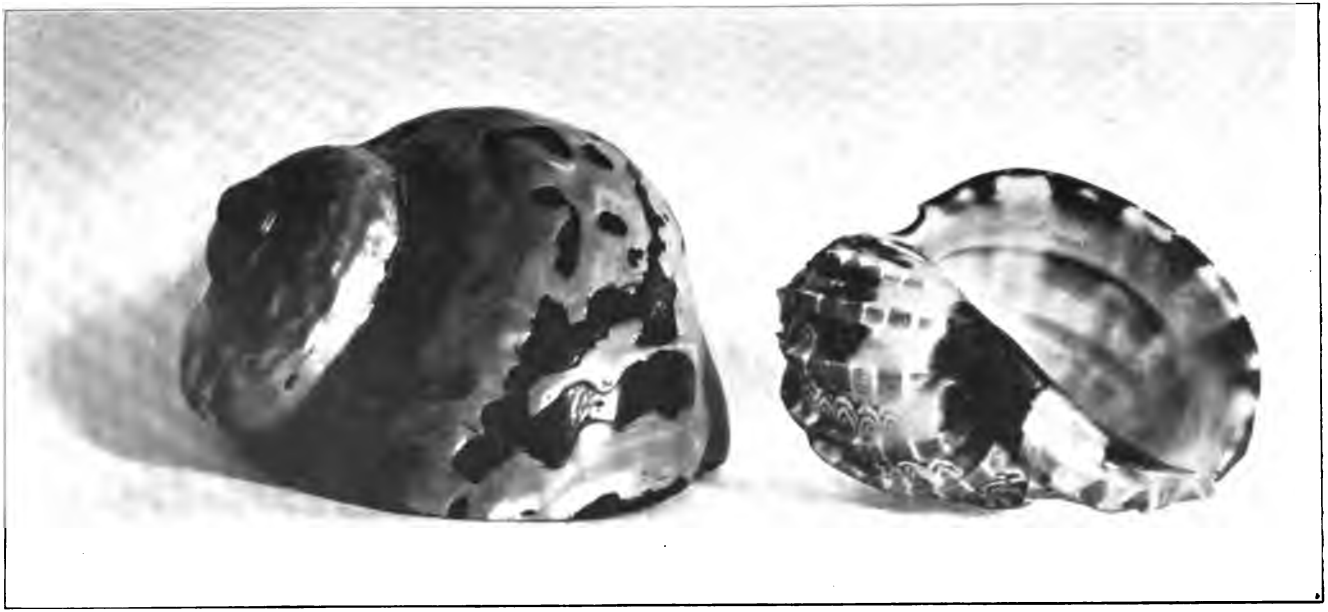


Fig. 4. Top Shell, or Turk's Cap, and the Common Harp Shell

known as a cleaned or skinned shell, and it is in this shape only that their true beauties are exposed. Take the common Ear shell, or Abalone, for example, shown in Fig. 5. That species in life not only is a development of a large and fleshy animal of very interesting structure, but its outer surface in life is dull, limy, and of by no means a prepossessing appearance. Remove the animal, however, and after the cleaning and polishing process has been gone through with we have a shell of most astounding beauty, exhibiting with iridescent color all of the most remarkable shades of blue, green, purple, and violet imaginable, the various irregular areas being sharply emarginated or outlined with a fine line of black. These Ear shells are used in large numbers for different kinds of pearl inlaying, or for other decorative purposes, and engraving and cameo work is often done upon the shell itself.

The trade at the present time in all kinds of shells is simply immense, and throughout the world it is a thing of most common

Fig. 6. A Murex, from the Coast of Mexico

occurrence to find a few of them in nearly every household, where they are displayed as objects of ornament, or with other bric-à-brac in cabinets or on mantel shelves. Dealers in shells often resort to practices which are liable to occasion confusion in the minds of amateur collectors. For example, many people who, in their journeyings, visit such a place as Key West, Florida, and while there find it is the thing to do to buy a quantity of shells to take back for friends or other purposes. So extensive is this trade that the shells of the Bahamas, Gulf of Mexico, and the West Indies have been insufficient to meet the demand, therefore many of the dealers in Key West resort to the importation of shells from other localities. As long ago as 1865 I bought in Key West several hundred species of shells, and last winter I took a number of these to my learned friend, Professor Simpson, who is curator of the department of conchology of the Smithsonian Institution at Washington, D. C., for identification. He quickly demonstrated the fact that my specimens

had come from all parts of the known world, and particularly from the west coast of North and South America and the Indo-Pacific region. Few of them, indeed, belonged or were collected in either the Antilles or off the coast of Florida and Mexico. In this connection I must thank Professor Simpson for identifying correctly the specimens I have used in many instances to illustrate the present article. Not a few of these shells, too, have been kindly loaned me from the cabinets of Mr. Edward S. Schmid, of Washington, D. C., who, apart from being a dealer in natural history material, has upon innumerable occasions often done acts that have been of distinct service to science in the way of furnishing specimens from foreign parts for the purposes of illustration and description.

Speaking of the collecting of shells, an old authority at hand remarks that "formerly the study of shells, called *Conchology,* was a very fashionable pursuit. At that period enormous prices were paid for some particular shells. A Carinaria shell once brought five

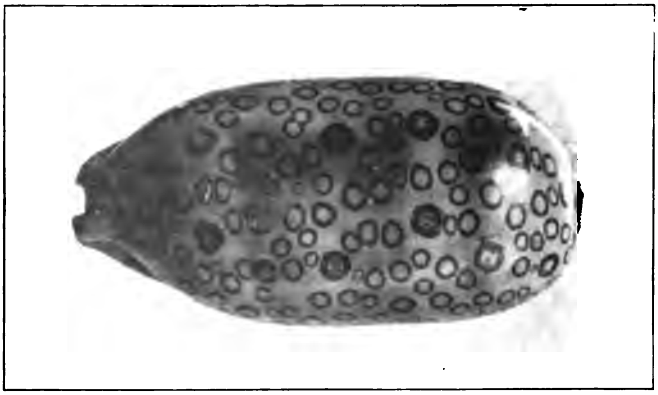


Fig. 7. The Argus Cowry, from the East Indies

hundred dollars; it is now worth twenty cents. In 1701, a wentletrap sold for two hundred dollars; in 1703, for one hundred dollars; it may now be had for one dollar. The prices of other shells have varied in a similar manner. Conchology, taking cognizance only of the shells, and not of the inhabitants that produced them and lived in them, was not a scientific study, any more than that of collecting old chinaware. It is the substitution of scientific zoology for mere shell-fancying, together with the frequency of remote voyages, which have made shells more common, and have wrought such a change in the value of these articles. Many of them, however, are intrinsically beautiful, and will always be objects of interest and value." Sometimes special shells remain in the keeping of families for very long periods. The shell, for example, shown in Fig. 7, an Argus cowry (*Cypraea argus,* L.), from the Indo-Pacific (Amboyna), has

been in the possession of the writer for over forty years, and I received it from Captain Skiddy, of New York City, and it had been in that family for nearly two hundred years, or, in other words, had been in the possession of man for a period of nearly two and a half centuries. There are a great many species of cowries known to science, and they constitute certainly a beautiful group of shells. I have collected many of the American forms on the Bahamas years ago, and one especially fine type found there is shown in Fig. 8, the *Cypraea exanthema cervus,* Linn. of science. The shell used for money on the west coast of Africa is a cowry (*C. moneta*), and these are collected by the British in immense numbers, to be disposed of to the negroes in Africa. It is said that in 1849 three hundred tons of them were imported into Liverpool for this purpose.

A complete account of the mollusca, even as far as at present known, would make a library of a great many volumes, but this fact should not deter us from gaining a few conchological points that

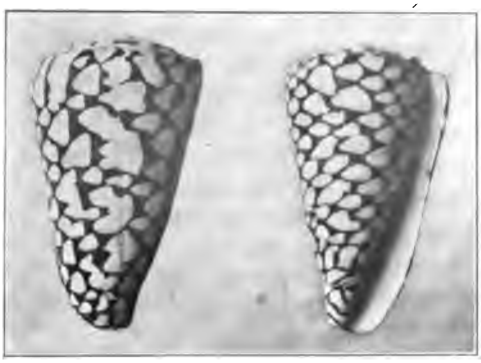


Fig. 8. Upper and Lower Views of the "Marbled Cone" from the Indo-Pacific

apply to shells everywhere. For instance, it is well to know that the soft bodies of the animals found in shells are in most cases enveloped in a kind of muscular skin called the *mantle,* and it is this mantle which by slow degrees secretes and forms the shell. "In some species the shell is of one piece," says a popular writer on this subject, "and is called *univalve;* in others the shell is double, the two parts being united by a hinge; this is called *bivalve.* The snail is a univalve, the oyster or clam a bivalve. Other shells, on account of their structure, are called *multivalve.* Many shells, as that of the oyster, are deposited in layers, a fine membrane interposing between each layer; they are therefore called *membraneous shells.* Most membraneous shells are lined with a brilliant enameled substance, called *nacre; mother-of-pearl* is the nacre of the pearl oyster. That of the fresh-water mussel is a beautiful azure. The other structure of shells is called *porcelaneous,* because they look like

porcelain or china. The common *Cowry* is a well-known substance of a porcelaneous shell. Some shells are so transparent as to resemble glass, and are therefore called *vitreous*." Two more specimens of univalve shells are shown in Fig. 8. They exhibit the dorsal and ventral (under) views of the handsome "marbled cone" shell (*Conus marmoratus*, Linn.) of the Indo-Pacific region, and often met with in collections. Those, too, who are at all familiar with the larger common shells found in cabinets will be pretty sure to know the "Mitre shell" (Fig. 2, *Mitra episcopalis*). It is one of the large spiral *Conidae*, being white all over and marked with oblique, transverse, double rows of squarish spots and larger blotches. These are of a bright cadmium yellow, and are so characteristic of the shell that the latter once known, one will always recognize the species afterward. As shown in the cut, the shell is seen upon its under or *ventral aspect*, the long axis of the specimen being perpendicular to the upper and lower margins of the page. It will be seen that this shell has half a dozen spiral twistings, and a pointed tip from which they start. Below is seen the large opening leading into the interior of the shell. Now, the pointed extremity is called the *apex*, and it is where the growth of the shell commences. The lines dividing the spiral turns are called *sutures*; they are simply the visible edges of the individual spires. The last are better known as *whorls*; the largest one, including the opening to the shell, is called the *body whorl*, and the opening itself is termed the *aperture*. This shell having belonged to an adult animal, the margin of the aperture is somewhat swollen to form the *lip*.

In the Conchological Department of the U. S. National Museum at Washington there are many shells arrayed in the exhibition cases, and one of these latter are devoted to specimens giving the terminology used in the description of shells in general. We find there beautiful specimens of large shells of a variety of forms that have been carefully sawn in different directions in order to show their internal structure. All of these are very interesting, and attract no end of public attention, and particularly those spiral shells that have been sawn in sections *vertically*, or in planes parallel to the shell's long axis. Were we to divide our Mitre shell in that way it would be seen that the *chamber of the spire* diminishes in size as we go in the direction of the apex, and that the whorls are twisted around a central axis, and this latter has been called the *columella*. It varies in structure, and this variance has given rise to other names for parts, and the very forms of shells themselves have a terminology, but we will not go into that here. Moreover, the characters of a *bivalve* shell have all been described, and their description is likewise too extensive to even present the briefest account possible in this article. I simply desire to point out to those interested in shells at all how we naturalists describe their points in detail, and it is with the hope that some of my readers will follow the subject up. One more point, however: If the Mitre shell is held in the hand with the

Engraved by
Central City Engraving Co.,
Syracuse, N. Y.

SEPTEMBER

Photographed and Copyright, 1900,
by W. G. C. Kimball

aperture toward the holder, and the apex pointing upward, as shown in my figure, it will be seen that the aperture is upon the ***right*** hand side—in other words, this specimen is what is termed a ***dextral*** shell; had the opening been on the *left* hand side we would have called the shell a *sinistral* shell. All these spiral forms of shells are either dextral or sinistral, but the dextral ones are by far the more common of the two kinds. A comparison of dextral and sinistral shells is here shown in Fig. 3; the small one to the left (*Murex raneosus,* Linn.), of the Indo-Pacific region, being a dextral shell, and the larger one to the right (*Fulgus perversus*), of our Atlantic coast, being a sinistral shell. This latter is occasionally dextral, but it is *extremely rare,* and specimens thus formed are of very high price. This common shell is known as the "Periwinkle," and its history is very interesting indeed. A good deal about it appears in a work published by our government entitled, "The Fishery Industries of the United States" (p. 694). It is well worth reading, especially by those who visit the Atlantic seashore where any number of these shells are found upon the beaches. Space, or rather the limitations of space, prevent me, I am sorry to say, from touching upon the subject here.

Other beautiful *dextral* shells are seen in Fig. 4. The large one is the Top shell, or Turk's Cap, so frequently found in collections, while the small one is the Harp shell. The former is from the Cape of Good Hope (*Turbo sarmaticus*), and the latter from the Indo-Pacific region (*Harpa ventricosa*). Still others are the "Porgie Conch" (*Strombus bituberculatus*), collected by the writer in the Bahamas, and the *Murex bicolor* of Mexico (Figs. 6 and 7 respectively). Much of the popular history of shells is extremely interesting, and as natural objects they have not escaped being incorporated with both traditional and recorded fact, fiction, and fable, as have so many animals and forms representing the various kingdoms in nature.

THE TRIMMING AND MOUNTING OF PRINTS

INTENDED FOR BEGINNERS.

BY ROBERT MELVILLE

PRINT-TRIMMING has been many times written of, and usually in the interests of pictorial photography. The average "mere beginner" is rather inclined to look askance at anything supposedly "pictorial," considering the word as synonymous with "difficult," and altogether beyond his needs or understanding.

But I hope to show why trimming, like any other detail of photography, is in its simpler aspects both useful and easy to the beginner. Just as the advanced worker complains that he gets too

much picture on his plate, speaking from a pictorial standpoint, so does the beginner suffer, from the point of interest.

Low-priced cameras are almost all made with a medium-angle lens. When the amateur attempts to take a view of a room at home, he finds that he can only get one corner of the room into his picture. For a subject of this kind a wide-angle lens is best, for the wider the angle the more of the room is shown in the picture. When, on the other hand, the photographer makes a snap-shot of a cyclist riding along the road, he finds to his sorrow that his cyclist, wheel and all, occupies scarcely an inch of the height of his plate. In this case the lens, which was of too narrow angle for the room, is too wide angle for the street. The beginning photographer often sighs over the same fault in photography that besets his more advanced brother: he finds that too much detail and too many incidents are crowded on to his little plate. Why does not the maker of a cheap camera fit it with a narrow-angle lens? The sufficient answer is found in a word that we hear more or less frequently nowadays—camera-extension. The trouble will be gotten over when the photographer has advanced beyond the stage of the beginner, by his purchasing a camera with a bellows so constructed that the lens can be racked out a good many inches from the plate. For the present it is enough that the more narrow angle the lens, the greater must be the distance between it and the plate. But the beginner, with his rigid "fixed focus" box, has no wish to carry around with him a camera twelve or fifteen inches in length. The maker knows that compactness is the thing that sells, and so makes a camera some five or six inches in length and fits to it the medium-angle lens, which is perfection for taking a house or a "view," but fails of the best result alike with indoor work and with snap-shots of passing incident.

Every beginner has noticed how absurdly close he must get to any one if he wishes to get a full-length portrait which fills the whole length of his plate; as to face portraiture he quickly learns that that is altogether beyond the possibilities of his camera. And so he turns out pictures of his friends, surrounded with much expanse of scenery, or garden, or house wall, and thereby hugely delights them.

To come to the pictorial. We are taught that unity is a very essential feature of good photography. In our photograph of our friend or our cyclist the figure is what we are after; the rest of the picture is included just because it happened to be there. Then why not get rid of some of it? Take a piece of paper, and cover an inch of one side of the print; similarly treat the other side. Then decide if there is too much sky or too much foreground. Somehow we always learn to trim foregrounds long before we trim any other part of the picture. Instead of using four pieces of paper it may be better to take two pieces, each cut to an L shape, so that each one will cover two sides of the print, and can be moved to cover much or little, as required. It may be that the print is all right without trimming, but, generally, using the scissors will be an improvement. It

is, of course, impossible to give any exact rules, but every worker will very soon find that there is one size in which some special picture appears most pleasing to him. Usually, in trimming round a figure, there is little need to leave more margin than just sufficient to prevent the figure appearing cramped in the space. You will understand what I mean by "cramped" if I quote the old rule that seated figures should always have sufficient space above them to allow of their standing up without bumping their heads against the top of the picture. The print should be so trimmed as to more or less follow the lines of the object photographed. We follow this rule when we hold our camera upright to take a portrait, and on its side when we wish to take a view. It is very seldom that a print is trimmed to the same proportions as a plate. Usually the plate is too square to give the best pictorial result; in our landscapes we trim off a strip of foreground and a strip of sky, and we narrow our portraits to give more of an upright panel effect.

The usual way of mounting a print is by using a mount from the dealers, with a plate mark or some other feature to mark the space occupied by the print. I would suggest that beginners make more frequent use of the passe-partout, and at the same time use up their spoiled negative glasses. This plan is most effective where a print is so trimmed as to show an even margin of not less than five-eighths or three-quarters of an inch all round when mounted on a 4 x 5 mount. I quote this size because it is the one I use. Choose a plain card of the right size and suitable color, and mount the picture *very carefully,* exactly in the right position, which, with beginners, will usually be the exact center of the mount. The way I do this is to place the picture on the mount and move it around until it appears quite true, and then slide it carefully, just a hair's breadth, downward. Then with a pencil rule a light line on the mount along the top of the picture. If the photograph is now pasted, and its upper edge laid carefully along this line, so as to *just* cover it, the picture will smooth down in its right place. To clean the film from a spoiled negative soak it for a few minutes in hot water, when the gelatine will melt and can easily be rubbed off with the fingers. In polishing the glass, remember that hard rubbing is necessary to get all the grease and finger-marks off.

The glass and mount are now placed together, and behind the mount a second board is often placed. The whole is now bound together with a strip of paper running round the four edges. This strip may be cut from any fairly stout paper of suitable color. I have often found glazed wrapping-paper which suited. Cut it into a strip about three-quarters of an inch wide, or rather less. Use a knife and a straight-edge; don't use scissors. One strip should be long enough to go entirely round the four edges. Lay the strip on a table and paste it well; unless it is quite limp with the moisture of the paste it may not stick firmly to the glass. Then take the glass and picture, and, holding them tightly together, press one edge on the

paper strip, so that an even one-eighth of an inch projects in front. The paper will now adhere to the edge; lift the glass and paper with one hand, and with the finger and thumb of the free hand press the projecting edges of the strip firmly down on to the glass in front, and on to the backing board behind. When firmly in contact, press a second side of the glass on to the paper, and so on until the strip binds entirely round. The strip should have been cut a little longer than exact length. If so, tear off the square bit and press the edge firmly down. The only trouble with a passe-partout is that the paper has an ugly habit of not going on quite as nice and straight and clean as it might do. The way to overcome this is by practice, without getting unduly nervous, and by being sure that the strip is sufficiently limp before pressing it down to the glass.

Having pointed out the trouble connected with the passe-partout it is only fair to point out its counterbalancing feature of acceptability. A print so mounted gives unqualified pleasure to juvenile friends, and especially to girls. It is easy to fix a tape to it so that it may hang from a tack. Before mounting, pierce the backing board in two places with a penknife, and with the point of the knife force an end of tape through each of the slits. Have the tape just long enough for hanging, and for about an inch through each of the slits. Spread these ends flat against the card and hold them in position with a piece of paper pasted over them. There is one small advantage of trimming which is of benefit to younger beginners. In many pictures where only the center of the negative is required a sheet of paper may be cut in two instead of trimming to waste after printing.

PHOTOGRAPHY'S HOPES

By Abraham Bogardus

ALL of photography has not been taught or written. New attainments and better results in its prosecution are gradually coming in sight, and are readily adopted. This will continue to be the case as its possibilities are discovered. From the early results of Daguerre, Niepce, and Talbot (alphabetical order) to the present results are almost beyond belief.

In view of this fact the mind becomes bewildered and can only ask, "What next?" We have keen-sighted men delving, and look to them for still greater results.

A witty writer says he has no birthdays. Photography has had many birthdays, and we may be startled at any time by another and a greater birth, perhaps a birth that will give greater perfection by a simplified formula. It does not require a prophet to say, "It will come." We must wait patiently the when, the where, the how, and the what.

The writer remembers when a small vehicle was invented by

which a legless man could perambulate by using his arms. It was thought wonderful that a man could actually propel himself. Now we see mankind and womankind propelling themselves on the bicycle so rapidly that we expect a head-first catastrophe at any moment. The broncho, the cob, or the Morgan are not needed to drag a man around the world; he goes by his own foot-power. Photography is verging on and will yet " get there " from its own resources.

These hopes are strengthened by the fact that photography is to a great extent in the hands of capable men, men of skill, judgment, and taste. With them I am content to leave it. Most if not all of the men who entered the race with me have gone, as I hope, to the region of eternal light. I, almost alone, remain, if not to instruct, certainly to advise.

It is certainly a great satisfaction to every lover of photography to see the difference there is existing between the intelligent photographer of to-day and the men who " took it up " in the early days of the daguerreotype. A man once came to me from Williamsburg, now part of Brooklyn. He said his pictures were not clear, like mine. I coated a plate, and proceeded to sit my assistant. As I focused the instrument, he asked, " Do you focus every time? " He thought if he set the focus in the morning *it was good for all day.* Another came from a neighboring State. He wanted instructions, but said he could not pay much, as he only worked at it when he hadn't any roofing to do. Just imagine a first-class man of to-day attempting to make a picture without focusing the camera! If " ignorance is bliss " it was not bliss for the ignoramus of 1846.

A USE FOR SPOILED PLATINUM PAPER

By Alfred Stieglitz

EVERY photographer who uses quantities of platinum paper will in the course of time be confronted with the problem what to do with paper which has for one reason or another spoiled on his hands.

What is *spoiled* platinum paper? Authorities seem to differ on this question. What one may call spoiled and useless another calls " soulful " and " just the thing." There is no doubt that slightly disintegrated paper has its value, especially for the modern pictorial photographer. In using the term " spoiled " we do not refer to paper of this character, but to such as is hopelessly " soulless," and is seemingly of no use for photographic purposes whatever. Such paper is usually relegated to the ash-barrel, or by the more economical it is sold to the refiner, and in this manner a few dollars or cents are saved from an otherwise total loss. The

average photographer, usually both gregarious and wasteful, follows the first course.

It was the writer's sad experience not so long ago to have a very large batch of paper go back on him, due to his own carelessness in storing it. In trying to make use of the same it was found to be in a hopeless condition. Possibly the hundred and one published suggestions of how to regenerate spoiled platinum paper might have been followed up, but time and lack of belief in the successful outcome of the experiments did not permit of this procedure.

What was to be done with these hundred sheets of 8 x 10 platinum paper? To throw such a large quantity of seemingly immaculate paper away offended his photographic instincts, besides meaning a financial loss, and to sell it to a refiner was equally distasteful to these instincts. Having mounted a batch of prints the day before, and having found much trouble in getting the exact shades of color to harmonize with the delicate tone of certain prints, the idea struck him of using this spoiled paper for mounting purposes. The experiment was immediately carried out, a batch of paper exposed to light, and developed in various ways with glycerine and brush (" Rembrandt " and other similar effects being thus obtainable), straight oxalate, mercury, etc., with most satisfactory results. Here was a method of not only using " spoiled platinum paper " to advantage, but it opened up new mounting possibilities: tones and colors could be matched to a nicety, and what had seemed an impossibility the day before in trying to mount a certain print satisfactorily on the tinted papers procurable commercially had now become a simple matter.

It is needless to go into details about the great possibilities of this method for mounting purposes. True, these mounts may be considered rather expensive, but for those endeavoring to do a thing correctly an extra expense of a few cents per mount will not deter them from using a method with so great a latitude as the above described. It is also needless to add that fresh paper will serve just as well as spoiled for the purpose. The mounts referred to in this article are mainly what may properly be called the intermount, which are interposed between the print and the mount proper to preserve the values of the print and blend it harmoniously with the mount proper.

Fig. 1. Water Boatman (Coriza undulatus) + 3½

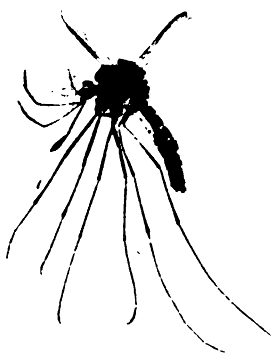


Fig. 2. Culex Mosquito, male + 3

PHOTO-MACROGRAPHY WITH A CAMERA

By W. H. Walmsley

(Illustrations by the Author)

"WHAT is a photo-macrograph?" is a question which will doubtless be asked by most readers of this article, if there be any with sufficient curiosity to undertake its perusal. All are doubtless acquainted with the terms *photo-micrography* and *micro-photography*, but *photo-macrography* seems to be a newly coined and unfamiliar word. And so it is. Recognizing the fact that in this free and independent country there is no law against such coinage, I have made the venture, and put it in circulation, under the belief that it will pass current as a convenient method of designating the slight enlargement of any object the details of which are too small to be seen by the unaided eye. Such an object is defined as macroscopic; a drawing of it slightly magnified by means of a pocket lens is a macrograph. If produced by photography, why may it not be termed a *photo-macrograph*, and the process *photo-macrography?*

A photo-macrograph, then, as I would define it, is a photographic picture of any macroscopic object slightly magnified in order to show its details as they would appear under an ordinary pocket lens. Its enlargement would be from one to ten diameters, never exceeding the latter amount and averaging from three to five. It can readily be made by the ordinary photo-micrographic methods, provided the microscope has a short, wide body and is fitted with objectives of sufficiently low power. But as the work is entirely within the scope of the camera alone without the aid of a microscope, is both fascinating and instructive, and presents an endless field to the amateur photographer when the advent of winter closes most of his usual avenues for exposing plates, I shall confine my remarks solely to photo-macrography by means of that instrument, and endeavor to point out briefly how it may be successfully accomplished.

The ordinary hand camera with short bellows is altogether useless for this purpose, even if constructed to carry glass plates and provided with a focusing screen, which latter is indispensable. With such a camera, having a bellows extension of a few inches only and a lens of four or five inches focus, it is almost impossible to photograph any object its full natural size, to say nothing of enlarging it. If the camera be one of the modern long-extension bellows, and has a lens of not more than five inches focus among its appliances, it will be possible to obtain amplifications up to five or six diameters, or even more with the apparatus as it stands. Of

course, the short-bellows cameras are vastly more numerous than those having a long extension; how, then, can the possessor of one of the former kind utilize it should he desire to take up photo-macrography? Let us see.

In making enlargements by means of a camera, the nearer the lens is to the object, and the farther away the sensitive plate or paper, the greater will be the amplification. This holds good equally with the enlargement of a small negative upon bromide paper and that of a macroscopic object on a sensitized dry plate. In the one case the workroom becomes the camera, the photographer working inside of it, no light being admitted save the image-bearing rays which pass through the lens used in making the enlarged picture. The size of the latter is determined by the dimensions of the paper and the distance from the lens at which it is placed: the farther away the greater the enlargement. Precisely the same conditions confront us in making a photo-macrograph. The nearer the lens is placed to the object the greater will be the amplification and the farther away must be the focusing screen and plate in order to secure a sharply defined image of the subject. It will become obvious at once that the ordinary bellows extension is altogether too short for the purpose, and we are obliged to devise some method of lengthening it or abandon the proposed work altogether. How shall this be done? Doubtless some means will present itself to every one of any ingenuity in " fixing things " to suit a purpose. A temporary bellows may be constructed of some material impervious to light and capable of being extended two feet or more. The camera having been opened to its fullest extent (with the focusing screen removed), may now be slipped into the open end of the temporary bellows and the joint covered with a focusing cloth or other light-excluding material in order to prevent the entrance of any at that point. To the other end of these bellows a frame similar to the rear of the camera must be fitted for carrying focusing screen and plate-holder, precisely as they are applied to the camera itself. This, of course, must be light-tight as well as all other portions of the extra fittings. All of this apparatus, including the camera, must be placed upon a table-top which will afford a support for it throughout and permit the bellows to slide freely and smoothly in focusing. Of course, such an arrangement would not answer with high powers, but for the low magnification employed it will be found quite sufficiently delicate and accurate.

If the construction of a bellows should be beyond the mechanical ability of the operator, he may make a couple of boxes of heavy bookbinders' board that will answer the same purpose. These should be some twenty or more inches in length; one of exactly the size and shape of the camera, the other just enough smaller to slide easily within the first, so that when closed they would present a double tube of some twenty inches or two feet in length, and twice as much when extended by drawing out the inner one. To the rear

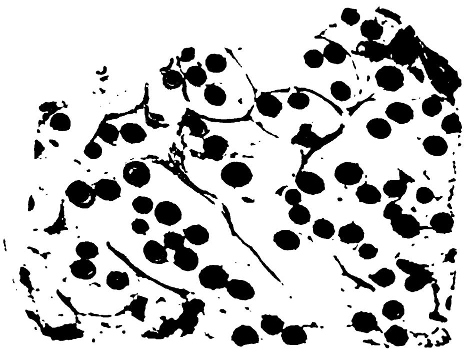


Fig. 3. Human Scalp, Flat Section
Hairs cut transversely + 7

Fig. 4. Wing of Cicada (Locust) + 2

end of this a frame for carrying focusing screen and plate-holder must be fitted. Any paper-box manufacturer will make these tubes for a slight cost, should the operator so elect, in preference to making them himself. Either of these plans will make a long-extension camera out of a short one at a minimum of cost and trouble capable of doing as good photo-macrographic work as the most elaborate apparatus that could be devised for the purpose, provided the lens is a good one and suitable for that work. Any kind of a lens will make a fair picture, but a good rectilinear of four to six inches focus is the best short of a costly anastigmat of same focal length. It should be noted that the boxes or bellows, whichever may be employed, must be coated on the inside with a dead black to prevent reflection. Other methods for utilizing a short-bellows camera in photo-macrographic work will doubtless present themselves to many, but it will be found that the same general principles must be embraced by all. Whatever form may be adopted, it will be necessary to provide a carrier to hold the object to be photographed in proper position before the lens. A piece of smooth board some five inches in width by one-quarter of an inch in thickness, and of proper length, fastened to a stout base, so as to stand perpendicularly, should be provided. The lid of a cigar box will answer admirably for the purpose. A circular or square opening, the center of which shall coincide with that of the lens when camera and object carrier are stood upon a table-top, must be made through this board to allow the passage of light when photographing transparent objects. The carrier will thus correspond to the stage of an ordinary microscope in perpendicular position instead of the usual horizontal one. A couple of spring clips for holding a glass slip, as with the microscope, should also be fitted to the board.

Having provided this simple apparatus complete, let us proceed to make a practical test of its ability to do the work for which it was designed. What kind of an object shall we use, opaque or transparent? Suppose we choose the latter, selecting the wing of a small butterfly as our subject. In its natural condition this is quite opaque, but may be rendered transparent by drying, soaking in turpentine or oil of cedar wood, and mounting in Canada balsam between two slips of glass.* It is rather more than an inch in length, too large to be embraced in the field of any ordinary microscope objective, but quite within that of our photographic lens. Having leisure at the moment for daylight work, we will use that as the illuminant. The table is accordingly placed with one end toward the window and pretty close to it. The object carrier is stood on it a little distance back, and behind this the camera. A sheet of white cardboard is then laid upon the table in front of the

* Those of my readers who may not be acquainted with the methods of mounting microscopic objects are referred to the many handbooks on the subject which are for sale by all dealers in optical apparatus. They can also obtain a great variety of mounted specimens from the same parties.

carrier and its outer edge raised to such an angle as will reflect the light falling upon it on to the surface of the carrier and the object already attached to it, in precisely the same manner as an object on the stage of a microscope is illuminated by light reflected from the mirror beneath. Now the camera, with its lens in front, is pushed toward the object carrier until within a few inches of the latter, and, with focusing cloth thrown over the head, we proceed to see what kind of an image of the object has been projected upon the screen, focusing it by moving the rear bellows or box back or forth as may be required. If too small, the whole camera, lens and all, is to be moved forward, or the object carrier may be moved backward toward the lens if more convenient, until the required degree of amplification is obtained, when the image must again be sharply focused by lengthening the bellows. A little practice will enable any one to do this quite expertly without moving the portion of camera carrying the lens or disturbing the image in any way, which should appear on the screen clearly defined and evenly illuminated. All this portion of the work may be done with full opening of the lens, but it should be well stopped down, say to F. 32, for the exposure. In this case the image of our one-inch object as seen on the screen measures four inches in length, showing an amplification of four *diameters,* or sixteen *times,* quite sufficient to define clearly the minute scales or feathers with which the wing is clothed, and which in our childhood days were known to us as dust, the "dusty miller" being a well-known object to every child. It only remains now to cap the lens, insert the plate-holder, draw the slide, and make the exposure. The latter will necessitate a much longer time than you have been accustomed to give in your ordinary landscape or architectural views; in fact, there is no comparison between them, nearly three minutes being required for this subject with a Forbes extra rapid orthochromatic plate and yellow screen. In using daylight as the radiant, it will be better to cover the space intervening between the object and lens in order to prevent any extraneous light from entering the latter. With artificial light this will not be necessary.

For night work with artificial illumination, say that from a coal-oil lamp, it is merely necessary to place the light behind the object and central to it, so that the rays may pass through and illuminate it evenly in all portions. This is facilitated by putting a sheet of ground glass between the source of light and the object, the ground surface turned toward the former. The illumination must be even and equally distributed over the entire field to insure satisfactory results. To test this, before making the exposure remove focusing glass and hold in its place, a little farther back, a sheet of white cardboard; and observe carefully if the illumination is alike all over the field reflected from its surface. If not, the lamp must be moved about until it is made so. The length of exposure will probably be about the same as that required with diffused

Fig. 5. Fruiting Frond of Maidenhair Fern (Adiantum pedatum) + 6

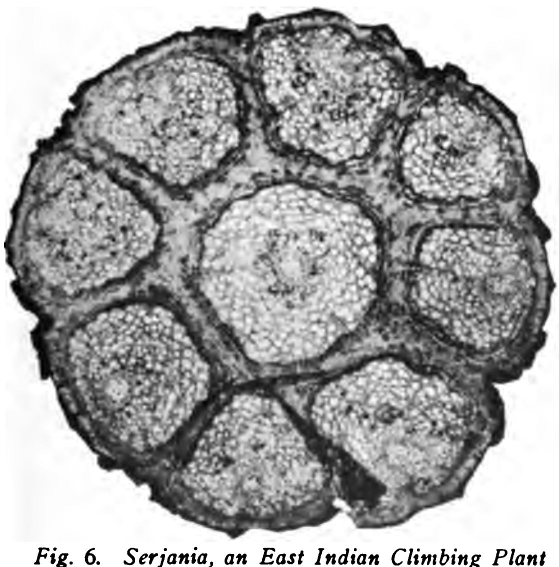


Fig. 6. Serjania, an East Indian Climbing Plant Transverse Section of Stem + 5

daylight. In illuminating opaque objects, the light may be condensed upon them by means of a bull's-eye condenser or concave reflector placed behind the lamp.

If I have succeeded in making my descriptions clear, it will be seen that the possessor of almost any form of camera can, with a little trouble and less expense, convert it into a piece of apparatus capable of doing very satisfactory photo-macrographic work, and which may be made the source of much pleasant and instructive occupation during the long winter evenings, now rapidly approaching. A few examples of such work, taken at random from my collection, are given with short details of their making, which I trust may possess sufficient interest for many to induce them to try doing the same for themselves. And may success attend their efforts!

Fig. I.—Water Boatman (*Coriza undulatus*).
Lens, Beck's rapid landscape, 7-inch focus. Plate, Forbes' slow orthochromatic, with two color-screens—picric acid yellow, and acid green. Stop, F. 22.6. Illuminant, diffused daylight. Exposure, 80 seconds. Amplification, 3½ diameters.

Fig. II.—Culex Mosquito, Male.
Lens, Beck's rapid landscape, 5-inch focus. Plate, ordinary landscape, without screen. Stop, F. 32. Illuminant, diffused daylight. Exposure, 15 seconds. Amplification, 3 diameters.

Fig. III.—Human Scalp, flat section, hairs cut transversely.
Lens, Ross' concentric, 4-inch focus. Stop, F. 22.6. Plate, Forbes' rapid orthochromatic, with two color-screens—picric acid yellow, and acid green. Illuminant, diffused daylight. Exposure, 2 minutes. Amplification, 7 diameters.

Fig. IV.—Wing of Cicada (Locust).
Lens, Zeiss' anastigmat, 6-inch focus. Stop, No. 50. Plate, Forbes' rapid orthochromatic, with two color-screens—picric acid yellow, and acid green. Illuminant, diffused daylight. Exposure, 2½ minutes. Amplification, 2 diameters.

Fig. V.—Fruiting Frond of Maidenhair Fern (*Adiantum pedatum*).
Lens, Beck's rapid landscape, 5-inch focus. Stop, F. 22.6. Plate, Forbes' rapid orthochromatic, one screen, yellow-green Illuminant, diffused daylight. Exposure, 60 seconds. Amplification, 6 diameters.

Fig. VI.—Serjania, an East Indian Climbing Plant. Transverse section of stem.
Lens, Beck's rapid landscape, 5-inch focus. Stop, F. 22.6. Plate, Forbes' slow orthochromatic, one screen, naphthol yellow Illuminant, diffused daylight. Exposure, 5 minutes. Amplification, 5 diameters.

It will thus be seen that four separate lenses, comprising three different systems of construction, were used in making the negatives from which these half-tones were reproduced, and that all show

about the same qualities in definition, flatness of field, etc. Each of these lenses is an excellent example of its class; there is no doubt about that, neither is there any, in my opinion, as to the suitability of any of the lenses furnished with modern cameras for the same work.

In conclusion, I would add that the prints from which these reproductions were made are on Velox glossy paper, which I still regard as the best for this class of work of any I have ever seen, an opinion confirmed by a practical experience extending over a score or more of years.

FAKING

BY HOWARD RUSH.

(Illustrations by the Author)

THE subject of faking is one that can hardly be adequately treated in one short article, for it is impossible to describe even a few of the many methods employed to change the nature of a print without going very deeply into the subject. Almost every worker has methods of his own, to obtain certain results, which are almost unknown to other workers.

There are two very good reasons why faking should be practised: one, when it seems advisable to change or remove some objectionable feature in a picture, while the rest of it remains intact, and again when it is necessary to change the whole picture to lower or heighten the tone in order to transform the whole composition from a mere photographic record to a picture with atmosphere, having more or less pictorial value. There is another reason, one hardly worth mentioning, however, for a method which is practised to a greater or less extent, that of faking a picture simply to change it into a "freak" of some kind or other; it may be both interesting and amusing, but a picture of real value is seldom the result.

Comparatively little faking is done in this country, probably for the reason that it is looked upon by many as a kind of illegitimate branch of photographic work, at least by those who have not reached the proficiency in technical work necessary to fake successfully. Again the argument of those who are more advanced and who are devoting their time and study to nature, is, that nature can not be improved upon, and that artistic effects which have the feeling and atmosphere of nature can only be produced directly from nature. This has been proved to be erroneous over and over again in masterpieces which have, in reality, been nearly faked out of existence as far as the original picture went, and yet owe their entire value to the atmosphere which they possess.

In an article on faking we have nothing to do with the photo-

graph as a record-maker, where the picture is taken for other purposes than pictorial beauty and sharpness is in most cases required. We are speaking of those pictures whose purpose is to convey some idea, to impress upon the mind some thought. In pictures taken with this end in view there are often objects which need modifying, or possibly doing away with entirely, shadows that must be changed

to heighten some effect, and often skies that may be altered to very great advantage.

A picture which is to represent or suggest some thought is of little value unless it has a sky which blends with the remainder of

the picture; that is, a sky which adds strength and completeness to the composition, yet is not so obtrusive as to draw attention to itself alone. The sky is so important in many compositions that it is really the keynote of the whole, for without it the picture is comparatively

valueless. When endeavoring to present some mood of nature in a picture the value of clouds is incalculable; in fact, the picture without them is impossible; they furnish the right atmosphere, or, more correctly, perhaps, complete it, bringing into it the feeling it would otherwise lack. Yet many a man will say that all that is necessary is to paint in a few clouds with India ink, etc.

Look at the clouds floating across the sky in the spring or early fall, notice the delicate high lights and shadows and beauteous half-tones, then think of trying to paint them into negatives! Most of the workers who are striving after perfection have found it difficult enough to get some slight semblance of the wonderful cloud forms they wish to copy with an Iso plate and a ray screen of known density. It would seem, therefore, that the only way to obtain clouds that are at all satisfactory for printing-in purposes is to make negatives of cloud forms in as many moods as possible. The man who wishes to do anything in pictorial photography should have no small collection of cloud negatives. The methods to be used to bring acceptable skies into a picture are simple enough, yet it takes both technical knowledge and considerable artistic ability to use them properly. The easiest and most satisfactory way to manipulate a sky, especially where platinum or carbon is used for the print, is to first print the sky from the sky negative which seems best suited to the picture to be made, carefully shading while doing so the part of the paper to be occupied by the foreground. When the sky is sufficiently printed the sky negative is changed for that containing the foreground. In some cases the sky of the picture negative is so thin that it tends to print through and soften or sometimes obliterate the clouds that have been introduced. It is often advantageous to soften the sky a little, but care must be taken not to make it look fogged; when this effect is not desired the sky can be shaded while the foreground is printing, in the same manner as was the paper while the sky was printing. In this way the sky can be brought down to the horizon of the picture; in fact, it usually extends a little below it. This, however, will make no difference in the finished print, as the picture is printed so much deeper than the sky that all traces of the clouds below the horizon will be obliterated. Very good reflection of clouds in water may also be made by first printing the clouds into the sky, then turning the negative and printing them where the water is to be. Fine effects can with a little care be produced in this way.

The great difficulty encountered in introducing a sky is to bring it to a correct tone with the landscape it is to complete. This is best done by the use of a print meter, the picture and the sky being separately printed on printing-out paper and the time of each noted when they correspond in tone. The operation should, with ordinary care, produce a well-balanced print.

The two prints accompanying this paper show what different effects can be produced from the same negative with comparatively

little manipulation. The first print made on platinum represents the picture very much as seen by the eye when taken; in the second print, made on bromide, slight underexposure and forced development produced the very different result seen.

THE USE OF THE SPEED NUMBERS ON THE PLATE BOX

By F. C. Lambert

THIS little note is intended to help the average amateur, *i. e.*, the man who wants to "know things" but does not feel particularly anxious to publish his ignorance by asking questions, and prefers to hunt through the pages of the International Annual with the hope that he may find answers to some of the various questions upon which he is not quite clear. One of the things that perhaps bothers him is the use of the H. & D. numbers, *i. e.*, speed-of-plate numbers according to the Hurter & Driffield system of speed testing. In a general sort of way, he knows that a plate marked 350 H. & D. is quicker, more sensitive, requires a shorter exposure than one marked, say, 275 H. & D. But he is not quite clear as to *exactly how much* difference to allow when exposing plates of different speed numbers. Perhaps the easiest way to help in this matter is to give a few examples. Suppose that we find 4 seconds a correct exposure with a plate marked 300 H. & D., what ought we to give under the same conditions when using a plate of speed 250? We can work this out as a rule-of-three sum by remembering that the higher the speed numbers the shorter the exposure in exact proportion, *i. e.*, as 250 is to 300, so is 4 seconds to required time.

$$\textit{i.e.}\quad \frac{4\times300}{250} = \frac{4\times30}{25} = \frac{4\times6}{5} = \frac{24}{5} = 4\frac{4}{5}\ \text{seconds.}$$

Or we can tackle the problem in a slightly different way, thus: Suppose 8 seconds is correct exposure for a plate of speed 210 H. & D., what is corresponding exposure for plate 240 H. & D.? State the matter thus:

A plate of 210 speed requires exposure of 8 seconds.
Therefore: " " 1 " " " 8×210 "
" " 240 " " " $\frac{8\times210}{240}$ "

$$\text{Thus:}\quad \frac{8\times210}{240} = \frac{\quad}{24} = \frac{8\times7}{8} = 7\ \text{seconds.}$$

Or again, we can say that if we have two plate speeds and two corresponding exposures, then the first speed multiplied by first

exposure equals the second speed multiplied by second exposure. Or in the previous example,

$$210 \times 8 = 240 \times 7.$$

These are but three slightly different ways of saying the same thing, and to the non-mathematical mind it is sometimes a real help to see the same fact put in two different ways. Finally, to put the matter in the form of a rule, "multiply the first speed by its corresponding exposure. Divide this product by the second plate speed. The quotient obtained is the second exposure."

IN THE VALLEY OF "THE SILVERY THAMES"

BY REGINALD A. R. BENNETT, M.A. (OXON)

(Illustrations by the Author)

THE Photographic Convention of the United Kingdom is this year holding its annual meeting at Oxford, and I have been ransacking all the literature available to find details of interest for publication in the "Official Guide," with reference to the excursions to be made during the eventful week. But it occurs to me that far beyond the confines of the English Photographic Convention, and even beyond the shores of old England itself, there is a public which takes an interest in the scenes with which my articles deal, and that in our ancient university we are constantly seeing the denizens of the New World, and are always glad to bestow a welcome upon Brother Jonathan when he likes to drop in upon us. Wherefore I propose to rescue some of the information got together for the Convention from the oblivion which will probably befall it after the Convention week is past and gone, by translating it in the form of another article to the imperishable pages of ANTHONY'S INTERNATIONAL ANNUAL. In former volumes, however, I have already dealt with Oxford itself, and also with the twin towns of Warwick and Leamington, which formed another of those inserted in this year's "Guide," so that my efforts will naturally be directed toward the third excursion; namely, from Oxford to the little village of Dorchester, which will afford any visitors an opportunity of seeing what the scenery of the Thames is like, and thus indirectly of much of the pastoral river scenery of England, especially in its midland counties.

For the river Thames, though it can not boast of such brilliant scenery as surrounds some of our English rivers, such as those of North and South Devon and Cornwall, or Yorkshire, nevertheless has a beauty of its own in which it admits of but few rivals, while the villages and towns which line its banks are frequently of great antiquity, and range in importance from the little villages like Dorchester, which once were renowned throughout the length and

breadth of the land, but now have fallen from their high estate, to such far-famed haunts of men as Richmond and Windsor, and even the great metropolis of London itself.

Having introduced my river to the notice of the reader in these favorable terms, let us now examine more in detail into its charms, for which purpose we will proceed through the town of Oxford to the bridge known as " Folly Bridge," a comparatively modern structure which replaced the very ancient one known in Saxon days as the " Grand Pont," a bridge which had no fewer than forty arches, and at one end of it the study occupied by Friar Bacon of pious and learned memory. At this bridge we descend to the brink of the river and embark upon one of the numerous steamers which daily ply between Oxford and Kingston-upon-Thames, but which will gladly take the wanderer to any intermediate point and drop him wherever his fancy may dictate. In our case let this point be Day's Lock, that being the nearest available point to Dorchester.

Abingdon, from the Thames

The college barges which line the left bank of the river are now merely used as stands for the purpose of viewing the summer eight-oared races, which take place every year, and of which the great event is the struggle for the headship of the river, last year held by Magdalen College and this year by New College.

These barges were originally modeled upon the old style of city barge used by the city companies and guilds of London, but they have been changed in form as time went on, by subsequent builders, who tried to afford the best form possible for viewing the races, and the only barge which really retains anything of the original shape is that belonging to Oriel College, of which the elaborate figures still decorate the sides of the entrance doorway, and the long, low prow, in which the rowers used to sit, still affords a standing-place for the summer visitors who throng the barges during the eventful week.

Shortly after the last of the barges is passed we emerge upon Iffley Reach, the place where the boats assemble before the races, which take place from this point to near the bridge from which we started. Here we pass through Iffley Lock, and on the other side come to a well-known piece of landscape in the background of which is the famous mill which has figured so many times on the walls of the Royal Academy. In the village is an exceedingly ancient Norman church, well worth a visit by those who have time, but, as the steamer to Kingston does not stop here, it will be best to make another excursion for that purpose on one of the local steamers which ply every half hour or so between Oxford and Iffley alone. during the afternoon in the summer months.

Some distance beyond Iffley we arrive at Sandford, where is an old inn that may tempt some to expose a plate, and passing through another lock we continue along the river until we reach the picturesque town of Abingdon. This forms a lovely picture from the river, with its ancient church spire and the old bridge in front of it. Before the town itself is reached, however, we pass a bit of river scenery which lends itself well to the use of the camera. This is Nuneham, the estate of Aubrey Harcourt, Esq., to the beautiful grounds of which the public are admitted on certain days. From the steamer a snap-shot can be taken of the rustic bridge which joins the island in the river with the main bank on the left. The foliage at this point is grand, the trees growing thickly right down to the brink of the river.

Clifton Church

Abingdon is a very ancient town, dating from Saxon times. Here the chief interest centers round the ruins of the Abbey, the grand old Parish Church, and the bridge. St. Helen's Church has the unusual feature of five aisles, which is an honor shared but by two or three other churches in England. The architecture of this church is mainly in the Perpendicular style. Close to the church, on its southwest side, is a very picturesque row of very old houses which form a portion of the old building known as the "Hospital of Christ," founded in the latter part of the fourteenth century. At Abingdon there are also an ancient market cross and another church dedicated to St. Nicolas, which possesses one or two Norman fea-

Engraved by
The Beck Engraving Co.,
Philadelphia, Pa.

By Howard Rush

SUMMER.

tures. The Abbey scarcely exists except in very small portions. It was once very renowned, and one of the wealthiest mitered abbeys in the kingdom.

A little further up the river beyond Abingdon we see Clifton Church on the right, and later on a clump known as Wittenham Clump, which accompanies the view and forms a background to the scenery for most of the rest of our journey. Shortly after this the steamer arrives at Clifton Lock, and after getting through this the river passes under Clifton Bridge, at the side of which is the very picturesquely situated church, which possesses no features likely to charm the antiquarian, but stands on a splendid site, the ground rising abruptly from the water's edge. The village is on the highroad between Culham and Dorchester, and contains some rather picturesque specimens of English village cottages, the most worthy of note being the inn called the "Barley Mow," which is a good subject for camera or pencil. On the other side of Clifton Lock the country is very pretty, the banks being thickly covered with woods close to the river, but in a short time it again becomes more open, with scenes of arable land and pasture instead of woods. We now have on the right bank the hill known as Sinodun Hill, one of the noted landmarks of the vicinity, and before long on the left is seen the ancient village of Dorchester, which forms the end of the proposed excursion.

The Side Chapels, Dorchester Abbey

The village itself is reached by a path across the fields, by the side of the Dyke Hills, which in ancient times were a fortress erected by the Romans. About half a mile's walking brings us to the village. This, though now only an obscure country hamlet, has a "past" which many a prosperous town of present date might envy. The place existed as one of the most important cities of the Saxon Heptarchy, and capital of one of its largest divisions, namely, the kingdom of Wessex. It was, in addition to this, the seat of an ancient bishopric much larger than any now existing in England, for it comprised within its jurisdiction the present dioceses of Winchester, Salisbury, Bath and Wells, Lichfield, Worcester, and Hereford.

In those days the Abbey Church was one of the grandest in the land, the admired of all beholders, who came to it from far and near.

The old church is still standing, but there are but few indications of the former grandeur of the place. The first Bishop of Dorchester was St. Birinus, who lived in 635, and who effected the conversion to the Christian faith of Cynegils, King of Wessex. His baptism took place at the hands of St. Birinus, in the very church we are now contemplating. But it was a different building in those days, though it has to a large extent been restored by architects of the present generation, and notably Sir Gilbert Scott, to as far as possible something resembling its former condition. The chief items of interest are:

Lead Font and Side Chapels, Dorchester Abbey

1. The chancel. This has two bays, and the one at the end was probably, in former times, the Ladye Chapel, and was built about 1330. On the left of the chapel is the far-renowned Jesse Window, which represents the descendants of the Patriarch springing from his recumbent figure, which is depicted at the bottom of the window.

2. The two chapels at the end of the south chancel aisle. These have been restored as far as possible to their original appearance by Sir Gilbert Scott. There were probably originally at least two chapels on the north and three on the south side of the chancel.

3. The side altar, which is at the angle of the nave aisle. Under this there is a crypt and over it is an ancient fresco.

4. The font. This is very ancient, is of lead—a very rare feature, and has on it figures supposed to represent the Apostles. The font dates from Norman times, but the base on which it stands is a good deal more recent.

There are the usual architectural features of old churches, in the form of sedilia, piscina, etc., which in this case have richly carved canopies.

The whole church measures 183 feet long, and covers an area of over 10,000 square feet. Portions of the original Saxon church still exist in some parts of the structure.

The return of the stranger to "Alma Mater," as Oxford is affectionately styled by her devoted sons, may be accomplished by river if time will allow the night to be spent there, but, if not, the return steamer passes so soon after the arrival steamer that it is best to return by train, which is easily accomplished by walking to Culham station, about four miles distant, which is only the second station on the Great Western Railway from Oxford. On the road to the station we pass Clifden Hampden, and the "Barley Mow" can thus be photographed on the return journey, with anything else in the village worthy of note, the road passing close to the church.

There are, of course, other points of interest about the old church at Dorchester and the surrounding country up the river, but I must not occupy more of the valuable space in the ANNUAL. Any one desirous of investigating the matter further can obtain guides in Oxford giving all information before starting on the expedition. Above Dorchester there are, of course, many other places worth visiting, the enumeration of which is too vast a theme for these pages, the reason for selecting the excursion herein treated of being that it is within the compass of an easy day's outing, and gives a good idea of the scenery of the Thames in the upper part of its career.

THE PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM

BY CATHERINE WEED BARNES WARD

(Illustrations by the Author)

WHEN asked by the editor of the ANNUAL for an article, I felt that some slight sketch of this annual meeting might interest American readers. The Convention first met at Derby in 1886, and this year we met at Oxford. It is the custom of the Council to accept invitations from various towns in Great Britain, and occasionally there have been foreign delegates. The Union Internationale de Photographie held a meeting at Oxford this year during the Convention week, and the members of the two organizations foregathered in a most delightful fashion despite difference of language. The Continental members proved a decided attraction.

Last year the Convention met at Newcastle-on-Tyne, and the smoky city gave us a grand welcome, with excursions to such places as Durham, Alnwick, and the Roman Wall. Each new meeting place seems to vie with its predecessors in its hospitality, and Oxford can hold its own with any of them, as I can testify from an experience of nine Conventions in Great Britain. The arrangements differ materially from those in America (where I attended three),

and business is not brought forward quite so prominently, while the distinction between professional and amateur is imperceptible. No competitions are held or prizes awarded, and the pictures exhibited are much in the nature of a loan collection, although there is always a photographic materials section. The subscription can not be called excessive, being five shillings ($1.25), but the excursions and annual dinner are extras, varying in cost with the necessary expenses. There are evening meetings, formerly held in the daytime, where papers are read or lantern slides shown, and efforts are always made to bring before the Convention the latest photographic discoveries.

The presidents are men of well-known distinction, and never has that been more the case than in 1901, when Sir William J. Herschel, of Oxford, held that position. Next year, at Cambridge, we are to have Sir Robert Ball, the great astronomer. There is always, besides the Executive Council, a local committee of leading citizens, headed this year by the Duke of Marlborough, the Marquis of Northampton, and the Earl of Warwick. The local secretary and general secretary labor for months in advance to make Convention week a success, and members attend year after year, our oldest and most constant member being over eighty years old. Permission is obtained to photograph in many interesting places, and often, as in Gloucester Cathedral, the dean or other high official personally receives the visitors and explains the history and architecture of the building. Such favors are much appreciated when places usually closed to cameras are thrown open, as in the colleges at Oxford.

Porch of St. Mary's, Oxford

Usually the Mayor, or other civic head of the city where the Convention meets, formally receives and entertains members on the first evening, and very often when excursions are made to neighboring towns the members are invited to luncheon by the local Mayor or some other prominent citizen, generally in the Town Hall. Last

Compton Wynyates, from the Moat

Broughton Castle and the Moat

year, when we visited Durham, we were entertained in the Banquet Hall of the Castle (now a university), where once the Prince and Bishops feasted. This year the Mayor of Oxford, in his official robes and gold chain, entertained us at the Municipal Buildings on Monday evening, July 8. On Tuesday we had our longest excursion of the week, starting by special steamer from Folly Bridge and stopping at Iffley, Abingdon, and Dorchester. At Iffley, well known in boating and artistic annals, we captured all we could of the old church and mill on our plates and films before going on to Abingdon, where there is not much left of the Abbey, but the town has many photographic possibilities which we improved to the utmost until luncheon.

At Dorchester we scattered in different directions, and as the village is some distance from the river it was a long, hot walk for those who elected to visit the grand old Abbey church, passing on the way over the fields the Roman earthworks, now called Dyke Hills. The church has been restored and is full of interest, though we could give it but scant attention. Two of its most curious objects are the fresco in the south aisle and the font, the upper part of which is Norman and the lower Perpendicular. The former is of lead and the carved figures are supposed to represent the Apostles. Near the church is a building some seven centuries old, once the Abbey Refectory, and now a school. We had no time for the quaint little village, but tramped back to the river, where, partly on the boat and partly on shore, we enjoyed, truly enjoyed, afternoon tea.

Part of the Abbey Buildings, Abingdon

The long journey back to Oxford, which we reached about ten at night, was diversified by several times touching bottom, the river being low and our load heavy, and our being followed along the shore between the locks by a noisy crowd of children begging for pennies. This caused many a scramble on the soft bank, and one lad fell in the stream, to the audible delight of his mates. The

majority of our party carried cameras, and one can not help wondering after such a day how many of the exposures made will result well. It is on record that on one excursion at a previous Convention some seventeen hundred exposures were made.

I should have stated that the bishopric of Dorchester centuries ago held under its jurisdiction what are now the dioceses of Winchester, Salisbury, Bath and Wells, Lichfield, Worcester, and Hereford. No wonder such a stately abbey church was required, now so out of proportion to its usual congregations.

Wednesday morning was set aside for Council and other business, but in the afternoon Sir William Herschel gave us a garden party in the beautiful grounds of Worcester College, during which the official group of officers, members, and guests was taken, and then we hastened away to prepare for the great function of the week, the Annual Dinner. It was made specially enjoyable this year by the singing of the Oxford Glee Club, who had already delighted us at the garden party. Among the various speakers were several of our foreign guests, who made most excellent and fitting speeches.

On Thursday was a very full day, as we went to Warwick, Kenilworth, and Guy's Cliff, being entertained at luncheon at Warwick by the Warwick Dry Plate Company. We visited a few of the many places of interest in the town and then drove to Kenilworth, etc. On Friday we went to Banbury (but failed to see the lady on the white horse), to Broughton Castle, and Crompton Wynyates, where we lunched under the trees. At the last two places the families of Lord Algernon Gordon Lennox (who rents Broughton) and the Marquis of Northampton were in residence, but they received us most kindly and allowed our photographic army to descend upon and capture their homes without resistance. The owner of Broughton Castle is Lord Say and Sele, and a magnificent painting of his ancestor being brought before Jack Cade hangs in the castle.

This was our last excursion, though some of us remained over Saturday in Oxford for more camera work, but the fine weather deserted us by that time, and those who, like myself, attempted any work did it under umbrellas.

Papers were read on Thursday and Friday evenings and slides were shown on three nights, the presidential address being illustrated by some very fine ones. The President's subject was color photography, and I am proud to say that several of the best slides were by a lady, Miss Acland, of Oxford, whose father, the late Sir Henry Acland, accompanied the Prince of Wales (now King) on his trips to America and India. Many ladies attend these Conventions, some with cameras, and since 1892 they have been invited to the Annual Dinner, while, save on two occasions, a lady has responded to the toast of The Ladies.

As an American I regret that not more of my countrymen

Oliver Cromwell's Council Room at the Reindeer, Banbury

Saxon Mill, Guy's Cliff, Warwick

and women attend these annual meetings. Their welcome would be exceedingly cordial, and, if they once came, they would always remember the visit pleasantly and want to come again. In my own case, there would be something lost in the year if Fate kept me from the Convention.

SOME QUALITATIVE TESTS ON DEVELOPERS

BY HENRY F. RAESS

Portrait of the Author. *By Hollinger*

IT is often desirable when purchasing a ready-made developer, where the name does not indicate its composition, to ascertain which reducing agent is present. The following series of tests were made on developers in the presence of akaline sodium sulphite, with the exception of "pyro," which was slightly acid with hydrogen sulphate. The concentration of the developers used was what might be called a strong, normal developer. The strength of the reagents used was as follows:

Hydrogen nitrate, HNO_3 .... sp. gr. 1.42
Ferric chloride, Fe_2Cl_6 .... 5%
Ferrous sulphate, $FeSO_4$ (slightly acid with hydrogen sulphate) 10%
Ammonium bichromate, $(NH_4)_2Cr_2O_7$ 8%
Sodium hypochlorite, NaClO, made as follows .... { chloride of lime.. 1 part; washing soda .... 4 parts; water ....32 " }
Fehling's solution, usual strength.
Potassium ferricyanide, $K_6Fe_2(CN)_{12}$ (saturated solution).

SOME QUALITATIVE TESTS

	HNO_3	Fe_2Cl_6	$FeSO_4$
HYDROCHINONE...	Small amount produces dark red color, excess changes this to a light yellow.	Dark brown color, gradually becoming lighter, changing to a faint blue, and finally becoming almost colorless.	Light yellow color.
PYROGALLOL.... ..	Deep red color, gradually becoming lighter.	First blue like ink, rapidly becoming brown; this test is very delicate.	Deep violet color; this reaction is very delicate.
METOL.....	Deep red color, gradually becoming lighter and finally changing to yellow.	Deep reddish brown color.	No change.
EIKONOGEN.... ...	Small amount, light red color; excess, dark red color.	Reddish brown color.	Slightly alkaline solution, gives a deep violet color, gradually changing to brown: slightly acid solution, a cherry red color.
PYROCATECHIN	Reddish yellow color.	Deep green color.	No apparent change when quickly mixed, but, if the developer is allowed to float on the reagent, a crimson ring is produced. On slightly agitating the test tube this changes to blue, then violet, then light green, which finally disappears, leaving the solution colorless.
PARAMIDOPHENOL.	Yellow color.	No change.	No change.
GLYCIN................	Yellowish red color.	First reddish brown, gradually becoming green, and finally violet.	No change.

$(NH_4)_2Cr_2O_7$	NaClO	Fehling's Solution.	$K_6Fe_2(CN)_{12}$
Yellowish brown color, deepens on standing, finally becoming red.	Green color, quickly changing to a brownish yellow color.	Gives a green precipitate in the cold, which becomes red on heating.	No change.
Deep red color.	Deep reddish-brown color.	First the blue color changes to green, then rapidly becomes brown; gives no precipitate on heating.	Deep red color.
Dark yellow brown color.	This test should be made as directed under pyrocatechin + $FeSO_4$. At the point of contact a blue ring is formed, while the developer becomes yellow, the blue ring gradually becomes green, changing to a light yellow, which darkens and finally becomes brown.	No change in the cold; on heating gives red precipitate.	Dark reddish yellow color.
Deep yellow brown color.	Deep brown color, quickly becoming light yellow.	No action in the cold; gives green precipitate on heating.	No change.
Deep red color, becoming denser on standing.	Dark yellow brown color, which becomes light yellow on standing.	Blue color changes to green; no precipitate on heating.	No change.
Dark yellowish brown color.	Dark yellowish brown color, changing to red after standing.	No change in the cold; red precipitate on heating.	No change at first; becomes reddish after standing a few minutes.
Deep red color.	Reaction similar to metol; blue color lasts longer.	Blue color rapidly changes to green, solution remaining clear; on standing becomes opaque; heating gives red precipitate.	Light yellow color.

CHILD PHOTOGRAPHY

By Grace Cook

(Illustrations by the Author)

PERHAPS the most interesting of all photography is the photographing of children. It is very easy with a quick lens, quick plate, and a flood of light, to get a good likeness, but in so doing how much of the picture-making quality one has to sacrifice. In at-home photography you seldom have light enough to take a picture at the greatest speed of your shutter. Then you have to first gain the confidence of the young sitter. I took pictures of one child that as soon as he saw the camera screamed and kicked, of course making it almost impossible to get any picture. After working about two hours I had him playing ball, and caught him when he was watching for me to throw the ball. Sometimes I can make a child pose by having it hold a dog or cat or doll and keeping it still while I take the picture. Of course, brush development makes a great many things possible in child photography—so much of the uninteresting part on a negative can be eliminated. In the portrait of Dorothy the background was an ordinary room and very obtrusive. You will see in the print that it does not show. In the portraits of Jean and Elinor the background was a Bagdad curtain. One way of procuring a plain, dark ground is to use sheets of cartridge paper. The lighting of children is much more difficult than that of adults because of their activity, unless, as before stated, you flood them with light and snap them at a happy moment. The little fellow Cornwall was a restless, nervous child, so I took his picture out-of-doors. It does not look like an outdoor picture, but with the proper arrangement of screens you can procure a studio lighting, rather the effect of it, out-of-doors anywhere, and with brush development the background does not make much difference.

Dorothy

Child Photography *By Grace Cook*

"THREE WORKING WRINKLES"

By F. W. Pilditch

AT this period of the year there is manifestly more photography done in the dark room than in the field, and every little hint that obviates the minor disabilities found constantly cropping up in the developing chamber should be welcome. We venture to give, therefore, to the readers of the Annual, the benefit of three hints that we ourselves have been successful in employing to advantage. At Christmas time we anticipate cold weather, with the consequent cooling of solutions and the chilling of developing dishes, measures, and other items used in the photographic procedure. This is our experience, and the following is our remedy:

After measuring off the quantities of solutions into our graduated glasses, we pour the combined fluid into what chemists term a "beaker," that is, a vessel of extremely thin glass with the upper edge turned slightly outward. These may be obtained in "*nests*" or sets of varying sizes, and a convenient set would be of two, four, six, and eight ounces capacity, respectively. We had previously procured a square piece of tin, in which we had cut four holes just large enough to allow the beakers to slide in easily. To the four corners of this tin were soldered legs just long enough to permit the tin to stand about four inches over our dark room lamp, while just two inches below the tin plate was soldered also a piece of coarse wire gauze or netting to prevent the beakers from slipping too low down and consequently upon which they actually rested.

This appliance placed over the dark room lamp when alight will keep all solutions at the moderate temperature suitable for plates, films, or paper development.

Where lamps are too high to allow of the above, a little ingenuity will soon settle how the same device may be conveniently applied, and when once tried the advantage will become strikingly apparent.

* * * * * * *

In conjunction with beakers, there should be a glass stirring-rod. This is a great utility, and, like other utilities, is attended with its companion evil.

It has a decided tendency to demolish beakers. To minimize this evil a piece of india-rubber tubing should be slipped over the end of the glass rod, care being taken to let the tubing project at least one-eighth of an inch over the rod. When placed in a warm solution this rubber has a great tendency to slip off, but if before it be placed upon the tube the latter be made hot in a gas flame, the rubber will be found to adhere permanently.

This is the common form of rod termed a "policeman" among

chemistry students. The one we recommend is, however, an uncommon one, and is easily constructed by slipping a second piece of rubber piping over the rod to cover it just at that point where it rests against the upper edge of, when placed in, the beaker. The advantage of a rod so protected will be readily self-evident.

* * * * * * *

Our final hint refers to plates covered at the back with a "backing" of soluble pigment which it is advisable to remove before development begins. With all backed plates there is an irritating tendency for particles to find their way on to the film side of the plate.

This is particularly the case when traveling. And it is ninety-nine chances to a hundred that the particles will alight right in a most conspicuous place, as, for example, the eye, or nose, or lip—if it be the portrait of a person. The precaution we take (often objected to by other workers) is to well wash the film side of the negative before proceeding to remove the backing prior to developing our plate.

Then should any particle of that backing find its way round to the film it will alight on the thin *skin of water,* rather than stick to the gelatine and leave its mark so obtrusively objectionable in the consequent negative, and will not have a chance of resting in one place.

This applies particularly to lantern slide work, where every mark is so exaggerated by the magnification upon the screen, and in which "spotting" is so much to be avoided in the lantern slide itself.

* * * * * * *

Moral.—"The proof of the pudding is in the eating thereof."

CRITICS AND CRITICISMS

By E. E. Weatherby

WE hear much of critics and criticisms, prizes and prize winners.

Sometimes we like to interrogate and inquire, Who are the critics? and why do we look to them as such and respect their decisions?

First of all in considering this subject from an artistic standpoint we must insist that the one posing as critic, to judge artistic productions, must of necessity be an artist himself.

Are there not too many so-called critics and do we not as a class pay too much attention to their utterances? Why should not every

true artist be a critic? Does he not put himself under the sway of the mystic or heaven-born influence which we call art, and therefore become as capable of judging as his brother artist, who poses as a professional critic and is recognized as such?

At a dinner one evening Lord Beaconsfield, who was then Prime Minister of England, was asked who the critics were. " The critics; the critics; oh! yes; they are the people who have failed in literature, science, and art."

While we admit there is considerable truth in the premier's definition, it is too sweeping in its scope to be true in every instance. We know there are some disgruntled medal chasers, to whom the above might aptly apply, but we must do justice to the honest, fair-minded judge who gives credit where credit is due, and again, is not afraid to point out a fault wherever it exists.

Winter *By J. E. Green*

But really, what is the basis of true criticism? Is it not simply the opinion of an individual against the field at large? And just as opinions differ, so do the verdicts of the critics.

Admitting that there are some rules which must be followed, we think, aside from this, there is too much catering to the whims and notions of those who probably have more effrontery than artistic taste or judgment.

Take, for instance, any exhibition where a considerable array of work has been entered for competition; do we all agree that the winner of the first prize or medal is justly entitled thereto?

Would we not rather give the place of honor to some more unpretentious person, whose reputation was limited, but whose work as

we viewed it was far more meritorious than the other? Or, dear reader, have you never been placed where you secured some honor or award of merit when you have felt, down in the depths of your inmost soul, that some one else was really entitled thereto?

Some critics are schooled along certain lines, theories, and fads, and everything they pass upon is naturally viewed from this particular standpoint, and one who is not in sympathy with him and holds to some other school will condemn his judgment, declaring him incompetent.

Perchance at one exhibition a fortunate artist may secure a medal, and for exactly the same class of work under another judge he would be relegated to second or perhaps third place.

Why should we not, if each one of us concentrates his knowledge and best endeavors upon a certain piece of work, throwing his whole soul into it, feel fully satisfied and justly so with his creation, and repudiate the verdict of any pretentious nondescript who might strive to tear down and destroy by some distorted theory of reasoning what we know to be good?

There are many beautiful and enchanting works of art extant, but they are not all made after the same ideas nor do they get the credit at all times which they merit, yet are they not just as truly artistic, though they should at times fall short of the appreciation due them?

Let us prove ourselves artists in the true sense of the word, not only "picture makers," and we need not seek the would-be critic nor fear his criticisms.

Since writing the above paragraphs I have noticed in an account of the National Educational Convention, held at Detroit this year, something that had escaped my notice heretofore, to the effect that for the first time no prizes were to be given at this convention, and President Core declared it had the effect of bringing out a finer exhibition of work by the members of the association.

This had the effect of causing me to think I had touched a popular chord in making the claims set forth, and that the sentiments expressed in the fore part of my article were held in common by some of the best known members of the craft.

The more I study and investigate the matter, the more firmly am I convinced that it is the only true light in which to view the subject of passing judgment on or criticizing each other's productions.

Engraved by
Electric City Engraving Co.,
Buffalo, N. Y.

By Aerney & Nordstrom

DEFIANCE

A DECIMAL VIEW-FINDER

By James Reuel Smith

THIS is not a camera attachment, but a scheme for numerically classing, filing, and finding negatives and prints. It is the first application to photographers' uses of the decimal system now being adopted in progressive libraries, by which kindred subjects are brought together as they can not be under alphabetical marshaling—" man " and " woman " are far apart in a literal arrangement, but numerically they may be set easily side by side. This is done by assigning every picture, first, to one of ten classes, and next to one of numerous sub-sections, which are numbered decimally, 5.426 preceding 5.43.

Three by two-inch slips of paper are put up in vest-pocket pads of 50 slips. They are of four colors, (a) white, (b) blue, (c) brown, and (d) pink, and are filed in slip boxes 11 inches long and one and one-half inch deep; a movable rod the length of the boxes runs through a hole in the slips near their lower edges and keeps them in place. Triangular blocks, front and rear, give the slips the proper slant, and a numbered guide of visiting card stock to every twenty slips facilitates reference.

The exposure and all subsequent records are made on " a," which are numbered and filed consecutively, as are the negatives on the shelves.

The descriptions of the views are copied on " b," which receive and are filed under their proper class numbers, and the mounted prints are filed under the same numbers, in boxes.

When a picture contains prominent minor subjects, duplicates of " b " are made on " c " and filed, for cross reference, under the minor subjects' class numbers.

An alphabetical index of every word in the class scheme with its number is made on " d," and to this index are added, on " d," the names of persons and places, etc.

Every slip bears the " a " and " b " numbers, and therefore shows at once the location of both negative and print.

This system automatically groups together prints of similar subjects—fire scenes, snow scenes, river scenes, etc., fall together, or, where, because there are several minor subjects and only one print, this is occasionally impossible, practically the same result is reached in the grouping of the cross reference slips.

A bright child will master the routine of the system in a few minutes, and will enjoy doing the work thereafter.

The slips cost fifteen cents per thousand and the cedar boxes four cents each.

The designations and names of the ten classes are: O. Sky, I. Water, II. Land, III. Structure, IV. Beings, V. Street Scenes, VI. Industries, VII. Amusement, VIII. General, IX. Special.

CLASSIFICATION.

CLASS O. SKY.

0. Sun
 .1 Eclipse.
 .2 Dog

1. Moon
 .1 Eclipse

2. Star
 .1 Venus.
 .11 Transit.
 .2 Jupiter

3. Cloud
 .10 Morning
 .20 Noon
 .30 Afternoon
 .01 Summer
 .02 Winter
 .001 Cirrus
 .002 Cumulus
 .003 Stratus
 .004 Storm
 .005 Sunset

4. Lightning
 .1 Forked
 .2 Sheet
 .3 Ball

5. Rainbow

6. Mirage

7. Aeronautics
 .1 Airship
 .2 Balloon
 .3 Kite

CLASS I. WATER.

10. Ocean
 .1 Gulf
 .2 Sea
 .3 Bay
 .31 Fundy
 .32 New York
 .4 Harbor

11. Lake
 .1 Pond
 .2 Puddle

12. River
 .1 Canal
 .11 Lock
 .12 Sluice
 .2 Brook
 .21 Rapids
 .211 Niagara
 .3 Whirlpool
 .4 Ford
 .5 Waterfall
 .51 Cascade
 .6 Spring

13. Wave
 .1 Tidal
 .2 Bore
 .3 Surf
 .4 Waterspout

14. Island
 .1 Swamp
 .11 Dismal
 .2 Marsh
 .3 Shore

15. Reflections

16. Boats
 .1 Commercial
 .11 Ocean Steamer
 .12 Sidewheeler
 .13 Steamboat
 .14 Ferry
 .15 Tug
 .16 Fireboat
 .17 Canal
 .18 Ship
 .181 Bark
 .182 Brig
 .183 Schooner
 .184 Cat
 .2 Pleasure
 .21 Steam Yacht
 .22 Launch
 .23 Sailboat
 .24 Iceboat
 .25 Houseboat
 .26 Row
 .3 War
 .31 Battleship
 .32 Cruiser
 .33 Monitor
 .34 Torpedo Boat
 .35 Submarine

17. WRECKS
.1 Maine

CLASS II. LAND.

20. MOUNTAIN
.1 Volcano
.2 Glacier
.3 Hill
.31 Mound

21. VALLEY
.1 Canyon

22. PLAIN
.1 Desert

23. FIELD
.1 Wheat
.2 Corn
.3 Cotton

24. PARK
.1 Public
.11 Yellowstone
.12 Central
.13 Fairmount
.2 Square

25. TREE
.1 Giant Redwood
.2 Willow
.3 Pine

26. ROCK
.1 Boulder
.2 Rocking Stone
.21 Cave
.211 Mammoth

27. GARDEN
.1 Flowers
.01 Growing
.02 Cut
.001 Rose
.0001 White
.0002 Red
.002 Pansy
.003 Daisy
.2 Plant
.3 Fruit

28. ROAD
.1 Walk
.2 Path
.21 Cycle
.22 Bridle
.3 Lane

CLASS III. STRUCTURE.

30. DWELLING
.1 City
.11 Interior
.111 Hall
.112 Fireplace
.113 Furniture
.1131 Bric-a-Brac
.1132 Statuettes
.1133 China
.1134 Silver
.1135 Grouped Articles
.1136 Christmas Tree
.2 Country
.21 Outhouses
.211 Arbor
.212 Trellis
.213 Summer House
.2131 Barn
.21311 Stable
.2132 Wall
.21321 Fence
.21322 Gate
.21323 Stile
.3 Farm House
.4 Villa
.5 Cottage
.6 Shanty

31. ECCLESIASTICAL
.1 Cathedral
.2 Church
.21 Entrance
.22 Window
.221 Memorial
.23 Altar
.24 Chancel
.25 Confessional
.26 Crypt
.27 Buttress
.28 Spire
.29 Gargoyle
.3 Monastery
.4 Convent
.41 Refectory
.5 Rectory

32. EDUCATIONAL
.1 University
.2 College
.3 Seminary
.4 School
.41 Trade
.42 Kindergarten
.5 Museum
.6 Library

33. HISTORICAL
.1 Ancient
.11 Pyramid
.12 Sphinx
.13 Obelisk
.14 Temple
.141 Parthenon
.2 Arch
.3 Tower
.31 Column
.4 Statuary
.41 Marble
.42 Bronze
.421 Equestrian
.5 Monument
.51 Cemetery
.511 Vault
.512 Tomb
.513 Tombstone
.6 Ruins

34. GOVERNMENT
.1 National
.11 Palace
.12 Castle
.13 Capitol
.131 Post-Office
.132 Lighthouse
.2 Municipal
.21 City Hall
.22 Court
.221 Prison
.23 Bridge
.24 Water Supply
.241 Reservoir
.242 Aqueduct
.243 Pumping Station
.244 Fountain
.2441 Electric
.245 Hydrant
.2451 Well
.2452 Pump
.2453 Trough
.3 Military
.31 Fort
.311 Fortification
.32 Battery
.33 Cannon
.34 Barracks

35. PUBLIC
.1 Opera
.11 Theater
.2 Hotel
.3 Casino

36. INDUSTRIAL
.1 Bank
.2 Store
.21 Shop
.211 Junk Shop
.3 Factory
.31 Refinery
.4 Mill
.41 Wind
.42 Water
.421 Dam
.422 Weir
.43 Flour
.5 Foundry
.6 Power House
.7 Wharf
.71 Dock
.72 Dry Dock

37. VEHICULAR
.1 Man
.11 Hand
.111 Palanquin
.112 Jinriksha
.113 Barrow
.114 Cart
.115 Car
.12 Foot
.121 Bicycle
.2 Animal
.21 Dray
.22 Cart
.221 Coal
.23 Wagon
.24 Truck
.241 Stone
.25 Carriage
.26 Coach
.261 Stage
.262 Tally Ho
.27 Sleigh
.28 Jaunting Car
.3 Railway
.31 Locomotive
.32 Car
.33 Train
.4 Street Car
.41 Horse
.42 Cable
.43 Electric
.44 Air
.5 Automobile
.51 Motor
.52 Ambulance
.53 Truck
.54 Delivery

CLASS IV. BEINGS.

40. PEOPLE
- .1 Men
  - .11 Police
  - .12 Firemen
  - .13 Soldiers
  - .14 Sailors
- .2 Women
- .3 Children
  - .31 Boy
  - .32 Girl
  - .33 Baby
- .4 Portrait
  - .41 Costume
  - .42 Character
  - .43 Poster
  - .44 Full length
  - .45 Heads
    - .451 Full Face
    - .452 Three Quarter
    - .453 Side
- .5 Races
  - .51 Indian
  - .52 Chinese
  - .53 Arab
  - .54 Gipsy
  - .55 Negro

41. QUADRUPEDS
- .1 Wild
  - .11 Elephant
  - .12 Lion
- .2 Domestic
  - .21 Horse
  - .22 Cow
  - .23 Sheep
  - .24 Dog
  - .25 Cat

42. BIRDS
- .1 Eagle
- .2 Gull
- .3 Canary
- .4 Pigeon
  - .41 Snaring

43. FISH
- .1 Flying

44. REPTILES
- 1. Python

CLASS V. STREET SCENES.

50. PAGEANT
- .1 Funeral
- .2 Mardi Gras

51. PARADE
- .1 Civic
  - .11 Circus
  - .12 Police
- .2 Military
  - .21 Artillery
  - .22 Cavalry
  - .23 Infantry
    - .231 Band
      - .2311 Drum Major
  - .24 Sham Battle
    - .241 Encampment
    - .242 Review

52. CELEBRATION
- .1 Columbian

53. VOCATION
- .1 Religious
  - .11 Preaching
  - .12 Salvation Army
- .2 Musical
  - .21 Organ Grinding
  - .22 Itinerant Band
  - .23 Singing
  - .24 Fiddling
- .3 Collecting
  - .31 Rag Picking
  - .32 Junk
  - .33 Old Clothes
  - .34 Begging
    - .341 Blind
    - .342 Lame
- .4 Vending
  - .41 Fruit
  - .42 Newspaper
    - .421 Second-Hand
  - .43 Push Cart
  - .44 Soda Water
  - .45 Ice Cream
  - .46 Lunch
- .5 Street Cleaning
- .6 Horseshoeing

54. RECREATION
- .1 Resorts
  - .11 Merry-Go-Round
  - .12 Shooting Chutes
- .2 Holiday
  - .21 Maying
    - .211 Picnic
    - .212 Dancing
    - .213 Juggling
  - .22 July Fourth
  - .23 Thanksgiving
    - .231 Mummers

55. Fire
.1 Apparatus
.11 Engine
.12 Water Tower
.2 Explosion
.21 Hell Gate

56. Accident
.1 Riot
.11 Fight
.2 Runaway
.3 Robbery
.31 Thief

57. Country Scenes
1. Camping

CLASS VI. INDUSTRIES.

60. Productive
.1 Farming
.11 Plowing
.12 Sowing
.13 Cultivating
.131 Irrigation
.14 Reaping
.15 Harvesting
.151 Haying
.152 Husking
.2 Mining
.21 Coal
.22 Gold

61. Manufacturing
.1 Lumber
.11 Logging
.2 Ice
.3 Brick

62. Commercial
.1 Transportation
.11 Stevedoring
.111 Grain Shipping

63. Construction
.1 House
.11 Bricklaying
.12 Painting
.2 Ship
.21 Launching

64. Dredging.
.1 Canal Digging
.2 Caisson Sinking

65. Demolishing
.1 Drilling
.2 Blasting
.3 House Razing

66. Household
.1 Washing
.2 Sewing
.3 Weaving
.4 Spinning

CLASS VII. AMUSEMENT.

70. Field Sports
.1 Golf
.2 Tennis
.3 Cricket
.4 Baseball
.5 Football
.6 Croquet
.7 Hunting
.8 Polo

71. Racing
.1 Horse
.2 Bicycle
.3 Boat
.31 Yacht
.32 Rowing

72. Skating

73. Swimming
.1 Bathing
.2 Diving
.3 Water Polo
.4 Fishing
.41 Menhaden
.42 Swordfish

74. Athletics
.1 Fencing
.2 Boxing
.3 Running
.4 Jumping

CLASS VIII. GENERAL.

80. Experiments
.1 Focusing
.2 Exposing
.21 Speed Tests
.3 Developing
.4 Printing
.5 Toning

81. Copies
- .1 Reductions
- .2 Enlargements
- .3 Coins
- .4 Stamps
- .5 Paintings
- .6 Engravings
- .7 Design
  - .71 Birthday Card
  - .72 Calendar
  - .73 Fan

82. Oddities
- .1 Doubles
  - .11 Dual Exposures
- .2 Spirit Photographs

83. Expositions
- .1 Philadelphia
- .2 Chicago
- .3 Paris
- .4 Pan-American

84. Night Scenes
- .1 Moonlights
- .2 Fireworks

85. Snow Scenes

86. Flash Lights

87. Phenomena
- .1 Earthquake
- .2 Storm
  - .21 Cyclone
- .3 Rain
  - .31 Fog
  - .32 Mist
  - .33 Haze

CLASS IX. SPECIAL

90. Microscopy

91. Ornithology
- .1 Nest
- .2 Egg
- .3 Young

99. Alphabetical Index
- .1 Names
  - .11 Persons
  - .12 Places
  - .13 Things
- .2 Titles of Photographs
- .3 Classes

INDEX.

Engraved by National Photo Engraving Co., New York

By James E. Taggart

WINTER IN THE COUNTRY

COPYING AND ENLARGING AT NIGHT

By Ottomar Jarecki

THERE is, perhaps, no excuse for adding one more to the many devices that have been described from time to time. There would be none whatever if these devices turned out to be all that their enthusiastic promoters claimed for them. A makeshift arrangement does not want to be too shifty, else no one but its fond parent will have patience to put up with its waywardness.

In a copying arrangement there must be means provided for centering the camera lens with the copy. For this reason a tripod is not satisfactory, as in moving the tripod back and forth, in order to get the size of copy correct, the centering must be adjusted each time.

The copy must be square with the camera back, that is to say, it must be parallel up and down and right and left, else the lines of the reproduction will not be true, and this is quite noticeable if the defect occurs in copying full size or nearly so. Therefore, the most reliable method is to have the camera and the copying board supported on a baseboard, so that when things are once carefully adjusted for parallelism there will be no more trouble about alignment.

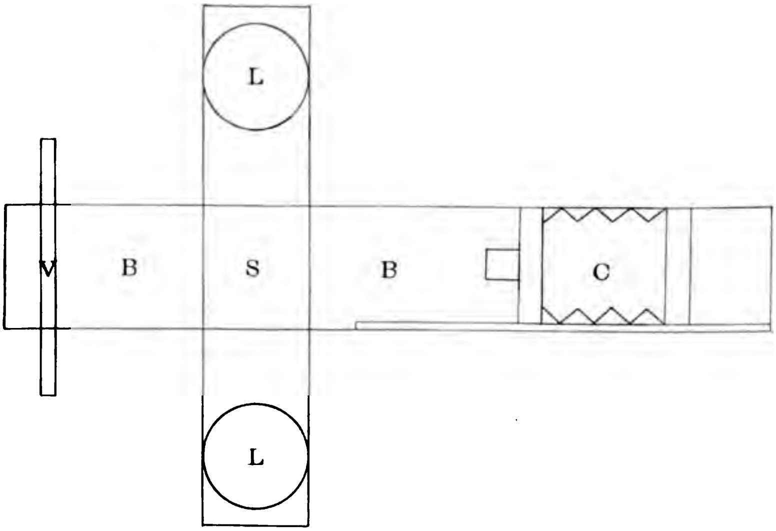
Then, too, for amateur work, artificial light is much more reliable and more satisfactory than daylight.

The diagram on the following page illustrates the apparatus as by the writer for several years past. In it BB is the baseboard, which is raised about six inches above the table, which happens to be an old sewing-machine stand. The board is about five feet long and twelve inches wide. At the camera end, a lath is nailed on the edge of the board on the left side, looking in the direction the lens is pointing. This forms a stop against which the camera is pressed to keep it in line. Further, C represents the camera and V the copy-

ing board, and LL two incandescent gas burners of the Welsbach kind. Lastly, S is the support for the lamps, being a strip of light wood raised above the baseboard and bolted to it at point S, and of proper height to center the light with lens and copy.

Treating the separate parts in detail, the camera actually used is an old-fashioned, half-size wet plate kind, but this and similar details must be left to the resources of the photographer. The writer has used a view camera—and a hand camera would answer equally well—fastening it to a board of sufficient length by means of a machine screw fitting the tripod socket. The object of the board is to give a good bearing against the stop of the baseboard and to keep the camera pointing properly.

For the foundation of the copying board a 10 x 12 Dixie vignetter was used as affording an economical device embodying mo-



tions up and down, sideways and circular, and thus aiding in the proper adjustment of the copy. The vignetting disks were, of course, removed and an opening cut admitting a 6½ x 8½ dry plate kit, and held in by means of little cleats and buttons. This does not come in for copying at all, as far as prints are concerned, but is used for making lantern slides by reduction from larger negatives and for enlarging purposes. Between the two parallel cleats found on the face of the vignetter, a thin board was fitted to be buttoned in to carry the print to be copied, and as this was easily detachable, the print could be conveniently arranged on it where there was plenty of elbow room to work in. A cross line was ruled on this for easy adjustment of the print. A picture dealer furnished a cheap frame to hold up the vignetter. This was made square, so that the vignetter could be reversed by buttoning it in either way, which was

another convenience in dealing with negatives where the camera itself did not have a reversible back. The frame was fastened to the base-board with angle-irons. This board should be made and put in place first of all, because the centering of the lights, and of the camera especially, depends upon this board. The camera had better be blocked up temporarily and tested for center, as even careful measuring will not always bring things true and in line, as the mounting of the lens will throw the center out on the ground glass, at times.

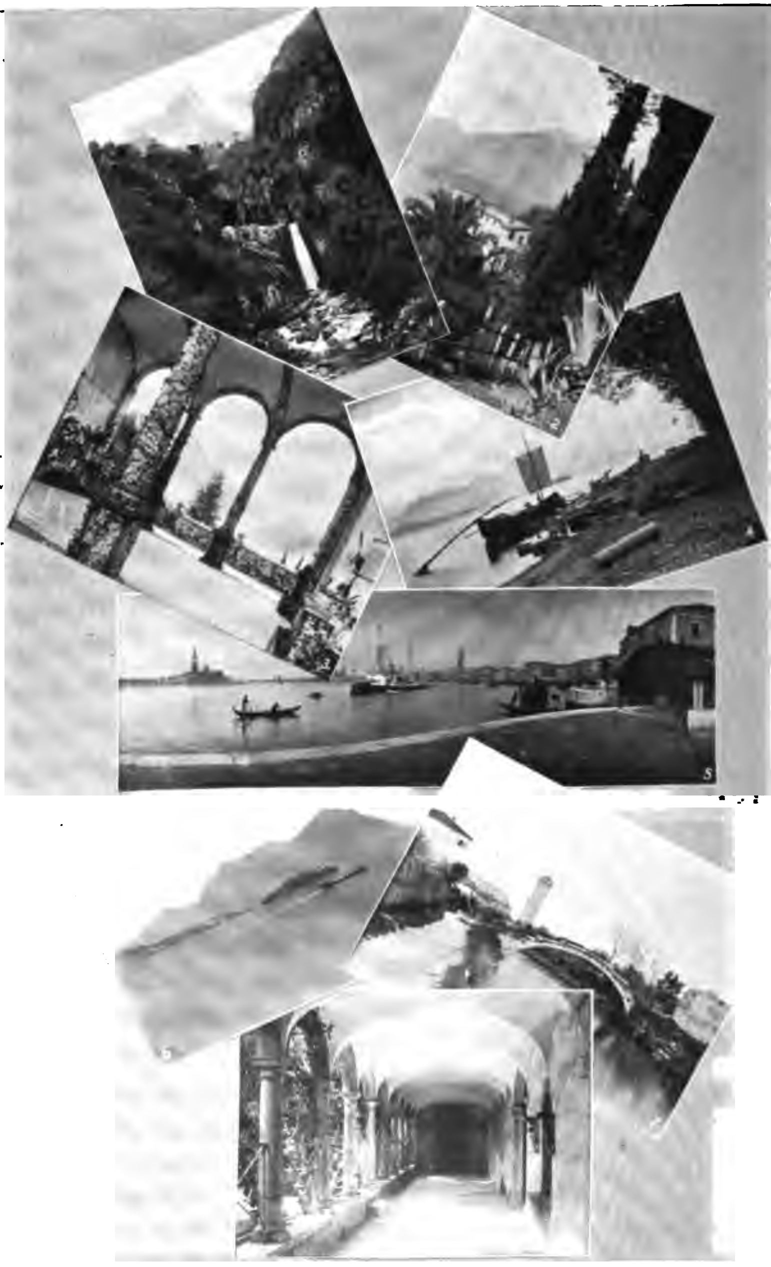
In placing the lights, the distance from S to V has been found to give best results at nine inches, and distance from center to center of lamps twenty-four inches. For lamps, even the cheaper grades do well, and for a base it is possible to pick up a cheap Bunsen or heating burner on hardware counters. Connections are made by means of rubber tubing to the gas supply. For a casing, an inverted tin pail or milk can answers well, having a hole cut for the chimney and another at the side, turning this toward the copy. This casing has the double advantage of shielding the light toward the lens and acting as a reflector in the other direction.

In the way of lenses, the writer has used a half-plate portrait lens with stop about one inch (say f-10) for lantern slide work, time of exposure four to five minutes, copying 4 x 5 full size, same time. For photo miniatures, or "button work," a quarter and ninth gem tube in addition give a full battery for all sizes, copying full size, reducing or enlarging, with a draw of bellows of twelve inches. The exposure runs from ten seconds to a minute with full opening of lens.

It will occur to the worker that with slight modifications, such as providing an easel for sensitive paper, the apparatus, and especially the copying board, answers well for general enlarging. The source of light most favored by the writer is the disk projected by a magic lantern, with source of light either oil, acetylene, gas, lime-light, or electric arc or incandescent. The lantern is arranged exactly as for projection, a sheet of paper or card being suspended back of the negative, and the light adjusted for evenness of illumination and sharp focus, using a slide temporarily in the lantern for the purpose. A ground glass is fixed one inch from the negative on the side toward the lantern. As the apparatus takes in negatives up to 6½ x 8½, it is far and away more economical than providing an enlarging lantern of sufficient condenser capacity.

Any further details will be gladly furnished by the writer, and his address will be forthcoming on application to the publishers.

As an afterthought it should be mentioned, that in using the magic lantern the alignment must be perfect to secure even illumination. On testing the light with the ground glass next the negative removed, a bright spot will be noted. This must fall in the center of the ground glass of the camera and the lantern must be shifted about till this is adjusted; it is not sufficient that the disk of light illumine the entire negative. This bright central spot is diffused when the ground glass is replaced.



1. *Mamette*
2. *Villa Serbeloni*
3. *Villa Balbianello*
4. *Baveno*
5. *Venice*
6. *Maggiore, from Baveno*
7. *Torcello*
8. *St. Lazzaro, Venice*

Chioggia

BY SWISS AND ITALIAN WATERS

By G. E. Thompson

(Illustrations by the Author)

THE Lake Districts of Italy and Switzerland, whether viewed from an artistic, photographic, or from a tourist's point of view, constitute one of the best hunting grounds in Europe. The pleasantest months for Italy are April and May, and as it is advisable to visit the southernmost point in our travels first, we leave the train at Venice to spend a week amid her many islands and calm lagoons, and also to gloat over her grand historical buildings.

We can do but little more in a necessarily short description than enumerate some of the chief points within the compass of the lagoons.

First, there is the monastic Isle of St. Lazzaro, the home of Armenian monks who have fled thither to find a rest from the terrors of the Turk. They form a peaceful community and will take a pleasure in showing you through their museum, their printing establishment, their Byronic and other relics, and, lastly, the beautiful cloisters and garden.

Further afield, about two hours' sail by steamer, we land at Chioggia, at one time the capital of Venice. Now it is chiefly the home of fisherfolk, and though there is still a fine cathedral and a few other notable buildings, the general air of the place is fishy, salty, and somewhat poverty-stricken.

A steamer leaves Venice every Thursday for the distant island of Torcello, where, amid fields and a few cottages, stands a grand old cathedral noted for its mosaics and finely chiseled marbles. On landing from the steamer and approaching the cathedral, every one must be struck by the simple view of canal and bridge, with the leaning campanile in the background.

From Venice, the train conveys you past the chain of Italian lakes, the three mostly visited being Como, Lugano, and Maggiore. The old city of Como offers a few attractions especially in its beautiful cathedral, a most artistic building, entirely of marble; but the central point and the one that commands easy access to all parts of the lake, is Belaggio, situated on a point where the lake branches in three directions. Belaggio stands at the foot of a wooded hill, its

Mamette

narrow streets climbing upward toward the old Villa Serbeloni, now a dependence of the Grand Hotel.

It would be difficult to find a more grateful retreat for a hot day than the wooded paths and heights of the Villa Serbeloni. From its many outlooks you view the distant towns, castles, and the snow-clad Alps that hem in the great lake. From Belaggio, steamers ply to all parts. Cadenabia, just opposite, is a favored resort,

Baveno

and, as the view taken from the garden of its Villa Carlotta shows, Belaggio can be seen to advantage from its shores. The Lecco arm of the lake, though not so much frequented by tourists as the portion between Como and Belaggio, abounds in grand mountain scenery.

With view of a portion of the beautiful Villa of Balbianello, situated on the point of Lavado, we must leave Como and make for the Lake of Lugano.

9. *Belaggio*
10. *Belaggio, from Cadenabia*
11. *Lugano*
12. *Como Castle*
13. *Belaggio*

The grandest scenery of this sheet of water is round about Mamette, where are little villages dotted about under savage mountain peaks abounding in pictures. Monte St. Salvadore, ascended by funicular railway from the town of Lugano, commands a wide, grand view of the lake and surrounding mountains.

A week at least should be spent at Baveno on Maggiore. There is a soft restfulness about this lake, as seen from Baveno, that never flags. The great mountain of the Sasso del Ferro looms up opposite in purple glory. There are the Boromean Islands tempting many a boating excursion, and lastly there are the wooded heights, the creeper-grown cottages, streams, and exquisite views at every turn. Small wonder that certain tourists linger for many months at a time at Baveno, and return to it year after year.

Lucerne

Time and space will not permit a description of fascinating Lucerne, the great Swiss lake of the Four Cantons. We can only show photographs, and say that in May its scenery is perfection.

EMULSION PAPER CONTAINING GOLD

By J. Joe

(Translated by Henry Dietrich)

WHEN emulsion paper was first put into market, a number of years ago, it met with a very slow reception despite its apparent advantages. The reason for this was, without doubt, that the toning, which was simple and sure with albumen paper, afforded many difficulties with the emulsion paper. By the introduction of the combined toning and fixing bath it was thought to remedy this defect, and it must be acknowledged that this bath has in fact greatly influenced the practical introduction of the emulsion paper.

The consequences and dangers of the application of the toning and fixing bath are sufficiently known. Accordingly, as the emulsion paper is now generally used, we try to produce durable pictures on it by separate toning and fixing, which requires, of course, a little experience.

Experiments have for a long time been made to discover a process for producing with a simple bath durable pictures in a satisfactory tone. This problem has been solved by the production of a gold-containing emulsion paper. Such paper is at present to be found in the German market in two different preparations, and professional as well as amateur may be interested to know some particulars about it.

The paper put into market by Messrs. Brandt & Wilde, in Berlin, under the name of Anchor-Doro-Emulsion Paper, is a celloidin paper which can not be distinguished in its exterior from other similar papers, and which prints in the same way as the other papers.

For toning, the printed pictures are put into a weak chloride of sodium solution, wherein they will, in a few minutes, assume an agreeable violet to blue tone, after which they are fixed in an ordinary fixing-bath.

The second paper has been put into market, under the name of Aceto Paper, by Lüttke & Arndt, in Hamburg, and is likewise a celloidin paper. Its film shows, in comparison with other celloidin papers, a yellowish color, which may be due to the peculiar gold addition. The paper prints somewhat stronger than most of the celloidin papers, and furnishes strong prints from negatives considered not the best. After printing it is, without previous washing, put into a fixing-bath prepared by dissolving a salt produced for this purpose, and called auto-fixing salt. In this bath the picture will assume first a brown tone, which passes gradually to violet and blue. This toning is also a pure gold toning, the picture becoming bluer after washing and during drying, which is not the case with all kinds of sulphur toning.

The convenience of working with these papers is great, as one is sure that if the process is sufficiently controlled this same tone can always be obtained with certainty. As it is a pure gold toning, there is no need to fear that vignetted pictures will turn green, or that, later on, the pictures will become yellow.

This paper is particularly adapted to the wants of the amateur, as he can obtain pictures of agreeable tone and great durability in as simple a manner as with the tone fixing-bath. It may, therefore, be accepted that, after the trials for the production of a suitable gold-containing emulsion paper have been crowned with success, its introduction for practical purposes may follow, it being a decided improvement in the positive process.

Engraved by
Geo. H. Benedict,
Chicago, Ill.

By D. D. Spellman

PORTRAIT.

THE QUEER QUARTET

By James Shepard

IN Volume VIII. of the Annual, for 1896, I discussed "Photographic Books," and as a continuation and practical application of the same subject I now take up the "Queer Quartet" and its book. Three amateurs from the New Britain Camera Club had done up the northwestern part of Hartford County, Conn., in a trip which we styled "Trio and Tripod," and lost our real names, being known only as "John," "Huggins," and "Sir Philip." When Litchfield County came to be taken we were joined by a professional photographer, whom we named "Elias," after the prophet, because he was after the profit in the use of the camera. As we could not longer call ourselves a "Trio," we changed our club name to the "Queer Quartet," although, John says, "we never mimickt a saw-mill nor a college class."

Our "Trio and Tripod" trip was published in the *Connecticut Quarterly*, with illustrations, and ran through the five numbers, January to January, 1895-96, with a few lines of introduction in verse, as follows:

"With a trio of tripods, a coach, and a span,
And with cameras four, two boys and a man,
Made a start, quite intent to photo creation,
For profit and pleasure and art recreation.
They 'exposed' on the towns, on the mountain and ridges,
The people, the meadows, the brooks, and the bridges,
And though pictures obtained counted up by the score,
They lamented when, passing, they lost one or more.

Now, the nags of this team had a deep chestnut hue,
And the natives consider a 'chestnut' the crew.
They called them the mail, and gypsies, and drummers,
Surveyors, and burglars, map-makers, and bummers;
The boy was called 'John'—he was such a good waiter,
And t'other was 'Huggins'—on account of his natur',
And the man was, from facts that ought not to be told,
Soon named 'Sir Philip,' and 'the boy that was old.'"

And so, after the same fashion, with "a coach and a span," and the very same chestnut nags, we followed the state map for eight days through Litchfield County in a zigzag circlet, which, when

traced off and separated from the other roads on the map, looks more like a map of Ireland than anything else. We photographed what we liked, moved as the spirit moved us through the day, and staid where we could at night without sleeping in the barn.

After our return, and when all the plates had been developed, we met at "Sir Philip's," where we dined by the kindness of "Philipine," his wife, and showed our ability to expose plates at the table as well as in the field. Then we examined our negatives, and agreed on such views as we would give a place in our book. I have already said that "Elias" was a professional, and he generously offered to make plain salted silver prints from the selected negatives for four books, one for each of us. "John" was an illustrator, engraver, and publisher, as well as a nonsense writer, and he offered

Overlooking the River at Falls Village
Canaan, Conn.

to do the chronicles and furnish a series of appropriate comic cuts. "Huggins," the newspaper man, did the printing, while "Sir Philip" matted the negatives, arranged the views, and had his draftsman make the title-pages, initial words, and printed with pen and ink the titles of the views on their respective pages.

The pages of the book are 8 x 11 inches, and they are permanently and handsomely bound in heavy boards and morocco. The hand-made title-page reads thus:

"In August, 1895, over the hills of Litchfield County, drove the Queer Quartet, John, Huggins, Sir Philip, and Elias, catching songs of nature with their cameras." Sketched in with these words are the hills, houses, and roads, together with team by which we went. Following the title-page is a map of "Our Tracks for Eight Days,"

as traced from the map by which we traveled, and then photographed down to a proper size for the book. Then follow John's chronicles and illustrations as printed by Huggins, beginning with "And," which Huggins left blank for Sir Philip's artist to sketch in with pen and ink from a photograph of one of the views of a bridge in the book, the railing of which formed a perfect AN, so all that the artist had to supply was the D.

There is an index of the 109 views arranged under the several days on which they were taken. Preceding the views for each day is a hand-made page with the number, date, and territory covered, as, for example, "First day, August 12, Plainville, Forestville, Bristol, South Chippin's Hill, East Plymouth, Horwinton to Torrington." The views are from 4 x 5, 5 x 7, 5 x 8, and 6½ x 8½

Cornwall Center, Conn.

plates, but are generally matted down so as to range from 3½ x 4½ to 6 x 8, and only one view on a page, no matter how small it may be. The prints are not mounted, but are printed directly on the sheet from matted negatives, so as to leave a clear white margin around each view, in the manner described in my article on "Photographic Books." Of course, as the views vary in size while the pages do not, the margins in this book are of varying widths. The paper is quite thin, the views soft and fine, so that the general effect, to one not accustomed to such printing, is more like the work of a printing press than it is like photography. Very good results can be had with gaslight developing paper matted in the same way. Although the paper has a tendency to curl, it behaves very well when bound in stiff covers. Thin flexible mounts of soft paper of

any desired tint or color may also be used and permanently bound into book form, but with such mounts for prints on developable paper the prints should be gummed, pasted, or glued at the edges only. In this way they will lie fairly flat without puckering the paper on which they are mounted, even when the mounts are quite thin. Huggins has some very attractively bound books of prints thus mounted. At the same time there is a charm in a view printed directly on the sheet, leaving a white margin. No mounted print can ever present such a neat finish, and in my opinion there is nothing that gives finer results than the plain salted silver prints.

The "Queer Quartet" book of 109 views, with the other matter before mentioned, fills 133 pages, the reverse side being blank, thus

Sharon, Conn.

making in all a book equal to 266 pages, and yet, exclusive of cover, it is only nine-sixteenths of an inch thick. The views are mostly landscapes, a few are historic, and the number selected for the book is sufficient to give a good idea of the country through which we passed.

This edition of four copies has made our trip a matter of history, and is a permanent reminder of many incidents which we are thus still able to enjoy. May this example induce others to preserve, by means of a still better book, the results of some of their outings which might otherwise be lost.

A CHEAP DEVELOPING TABLE

By George Kilburn

DOUBTLESS there are many amateur photographers who wish for a simply constructed developing table, and one that is inexpensive. For simplicity in construction and low cost the one I will describe will suit those whose purse is limited and whose space is of the same order.

First procure a second-hand sewing machine stand or frame. These can be had in most towns for a very trifling sum of money. Most of them have a hole cut out of the top. If this is not of a suitable size, cut it to the size required; then have a dish

Forest Lake *Geo. W. Payne*

made at the tin-worker's of either some stout tin, zinc, or lead, to fit the hole, and with a flat ledge all round. For the purpose of emptying, the dish can have a short bit of pipe soldered underneath, and fitted either with a tap or plug as desired. When using the sink for developing, a pail can be placed under the sink to receive the waste. To economize space still further, the iron framework can be boxed in, and the lower part made to hold dishes, bottles, or other sundries. I forgot to mention that the fly-wheel and treadle part must be removed first. A narrow strip of wood about an inch broad can be fastened round the edge of the table to prevent the clothes being splashed while developing, and also to save the dishes from being pushed off and getting broken.

GOLF AND LIFE—A THOUGHT

By Digby Cotes-Preedy, B.A. (Cantab.)

(Illustrations by the Author)

ANY an old golfer will endorse Mr. Andrew Lang's sentiment:

"I hae played in the frost and the thaw,
I hae played since the year thirty-three;
I hae played in the rain and the snaw,
And I trust I may play till I dee."

How many see the striking similarity between golf and the game of life? Some of us start off like a well-driven ball toward our goal. For a while all goes well; then, perhaps, we get "bunkered" by some difficulty which we did not think could embarrass our progress. Perseverance overcomes the trouble and we continue moving toward the home green. Others may have an uphill fight like the golfer who fails at the tee. Nevertheless they strive—often successfully—to reach their ambition. But however well we play Scotland's game, "Colonel" Bogey will conquer us in the long run. So with life: we play with our unintelligible being until we are beaten and lie helpless on the last green awaiting the summons "Home."

Putting—Mr. Hilton and Fred Collins (Llandudno)

"In a Bunker"

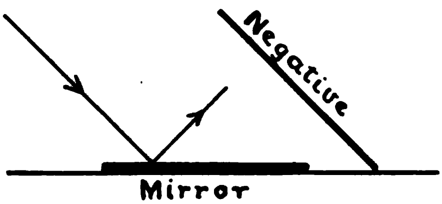
EXTEMPORIZATION IN PHOTOGRAPHY

BY H. M. GASSMAN.

THERE are two things essential for accomplishing a desired result: one is to know how and the other is to have the means at one's disposal. We will assume that the person has passed beyond the *wasteful* experimental stage, and that his past experience will limit him to attempting only such things as could reasonably be expected to be successful.

It is evident that a lens and a loaded camera are the first tangible requisites. If the amateur does all his own work, from the taking to the finishing of the picture, he can make use of a score of accessories, some of which are necessary, while others might be considered as luxuries of the art.

Those who are so fortunate as to have a plethoric purse can secure on the market many things which will be useful in carrying on the work. But the majority of photographic enthusiasts are those to whom money is an object of some value. Such individuals often possess the faculty of converting material at hand into something useful. Frequently an article may be put to an entirely



different use from that for which it was made. For a trivial amount a thing may often be purchased and slightly remodeled so as to be as useful, though less expensive, as the same thing made expressly for that purpose.

Extemporization in this line should be encouraged not alone because of pecuniary saving, but because it develops an originality which in an emergency may prove of immense value. It is only necessary to keep an eye open for the fitness and relationship of things in order to evolve any number of schemes and combinations of things. From our own experience we give the following to explain the point we have tried to make:

It is a difficult thing to add bromide solution drop by drop to the developer. Why not use a pipette or filler such as is furnished with a fountain pen? Secure a bromide bottle deep enough so that the tube will not touch the bottom, and with a sufficiently large bottom so that it will not easily fall over. If the neck is too large to be filled by the rubber tip, slip the tube through a proper-

sized cork. The arrangement is quite convenient, but probably could not be bought complete anywhere. The idea is not new, but this application is new to the writer.

If a retouching desk is not available it is somewhat tiresome to stand up to a window for a long or even a short time retouching a negative. Why not place a small mirror horizontally on a table near a window so as to reflect sky light and place the negative near it, as the illustration shows? This gives an intense light where needed and is not a strain on the eyes.

Suppose a background is wanted and there is nothing at hand except a large square piece of steel-gray cloth. Spread it out and tack a wooden stick across the top. Dust a white powder, such as flour, over the parts desired white and use lampblack similarly for the dark spots. Rub it into the cloth sufficiently to keep from falling off. Suspend by a string from the middle of the stick. During exposure give the background a slight motion, which will make wrinkles and seams disappear and give a soft, blurred effect, such as is obtained by throwing the background considerably out of focus. The results are marvelous, especially if the motion be somewhat circular.

In these and other cases it is a matter of making means serve a given end. As long as we can secure a desired result it matters not how crude or refined the steps so long as they are legitimate.

THE TREATMENT OF GELATINO-CHLORIDE PRINTS

By J. H. Harvey

JUDGING from the frequent inquiries made, many amateurs seem to experience trouble in the glazing and mounting of their P. O. P. prints.

The most usual cause of complaint is the refusal of the prints to strip from the glass, the commonest reason assigned for this being want of cleanliness of the glass.

I have noticed in my own practise that in the summer months, when the temperature of the water coming from the street mains is considerably above normal, and the gelatine consequently becomes very soft, there is a greater tendency for the prints to adhere to the glass than in the colder period of the year. (This, of course, refers to the work of those who do not use alum, and many object to its use in consequence of the difficulty of driving it out of the gelatine afterward.)

For some time past I have adopted the plan of coating the glass with enamel collodion before I squeegee the prints down upon it. The glasses are cleaned and treated with French chalk as usual; the chalk is then lightly dusted off and the plate coated with enameling

Engraved by
Hartel Engraving Co.,
New York

By Alfred Holden

MIDST SMOKE AND HEAT

collodion in the customary manner, and after the collodion has set it is placed in a dish of clean water or held under the tap until all greasiness has disappeared and the water flows over the glass in an even sheet. The prints, which have been dried, are again soaked in water and then withdrawn face down, the face being drawn over the edge of the dish so as to wipe off any foreign matter that may be upon it, and then placed face down on the collodionized glass, a piece of blotting paper is laid down on it, and on this a sheet of india-rubber cloth is put, the squeegee being then used on the lot so as to press the prints into perfect contact with the collodion film and drive out all air bubbles.

I find that the layer of collodion between the gelatine and glass prevents any chance of the print sticking to the glass by reason of the softness of the gelatine, due to the comparatively high temperature of the water, and which, even if cold when coming from the pipes, soon draws heat from the atmosphere and rises in temperature in hot weather unless ice is used.

As a support for holding unglazed prints during the operation of pasting their backs previous to mounting, I have found a piece of clean linen, which is free from fluff, a suitable material, as there is no tendency of the gelatine surface to stick to it, for when the hardening influence of alum has not been taken advantage of, the face of the print will, as a rule, stick to anything much more easily than the back will adhere to the mount. I have indeed seen prints that have been placed face down on paper or glass before pasting become so firmly attached to it as to defy all attempts at removal.

THE SKETCHER IN STRATFORD-ON-AVON

By Signor Aspa

(Illustrations by the Author)

SOME papers of mine in back volumes of this ANNUAL were devoted to a description, by pen and photo, of the interesting villages named in some doggerel lines attributed to Shakespeare. Since the time of the boisterous frolic that gave occasion to these lines the villages in question have, doubtless, most of them been enlarged and modernized. But, nevertheless, they certainly are, together, well calculated to give the inquiring traveler an excellent idea of the country and its houses as they were seen by the people in the time of Elizabeth. Of Stratford itself I have said nothing, feeling pretty sure that, through prints and photos, the birthplace and the tomb would be as well known in the States as they are here.

But since our kind editor's request for a paper this year reached me I have been to Stratford several times, and have secured a few views that may serve to show how much pictorial interest the place possesses over and above the historical or sentimental.

In one of my papers it was shown how great an interest attached to the woods and fields, the lanes, roads, and villages frequented by Shakespeare, both in youth and in later life. It seems to me that much of the same interest should also be felt in the town

Old Houses on the Way into Town
Note the suggestive name, "Garrick Court"

through whose streets his steps wended daily so many years. And though, particularly in the High Street, the progress of the times and the increase of business have caused many old houses to be pulled down and rebuilt on modern lines, yet many other of the old ones,

Henley Street
Looking East

Henley Street
Looking West

many picturesque roofs, gables, and dark corners still remain to delight the eye and the fancy of the impressionable traveler.

I am well aware that many travelers are blind to such things, are impervious to these impressions. I have, indeed, just witnessed an

amusing instance of it. Going to Stratford this week to get a few last photos for this paper, it was my good fortune to have for traveling companions three young American ladies, equipped with cameras, bent on the Shakespearean pilgrimage. Going by rail from Leamington to Stratford there are glimpses to be had of Leamington itself, no bad subject, then the Avon, Warwick Castle, and town; a glimpse of Leycaster's Hospital in the distance, of the desecrated Church of St. Michael; of Budbroke Church, and of the smoothly rolling pastures, tangled hedges, and comfortable farmsteads dotting the landscape all the way. Of these things no one of the three took the slightest heed—not one looked out of the window once the whole way. On arrival they went by omnibus to the church, and I much doubt if they saw anything in Stratford beyond

Market Place, Market Hall

the tomb and the birthplace. I firmly believe that hundreds of others see no more.

The few photos here reproduced are from points of view rarely tried—for instance, the birthplace—indicated by the man and bicycle leaning against it—with Henley Street, in which it stands, shown both ways from end to end.

The next plate shows the Market Place and Market Hall. Not very many years ago a cluster of old buildings stood in the open space. They were very picturesque, but also very dirty, and their removal was beyond all question a public benefit.

If from the Market one turns to the left, *i. e.*, to the Warwick Road, an opening on the right, only a dozen yards or so along, will

be seen that leads down to the end of a branch canal, which connects Stratford with the canal from London to Birmingham. It is to be well understood that this has nothing to do with Shakespeare, but it has much to do with W. Black's charming "Adventures of a House-Boat," of which the lovely American heroine, Peggy Rosslyn, when the boat is supposed to have been moored in the spot here

Canal Terminus

Lock on Canal

represented, becomes so interested and so excited by going over the very ground the poet trod that in the evening she delights her friends by taking for a brief interval the character of Rosalind, which she enacts with equal spirit and modesty.

Few female characters have been so faithfully drawn, or are so charming in themselves as this of Peggy, and of her countrywoman

High Street

The Guild Chapel

"Octavia Bassett," in Mrs. Burnett's pretty story, "A Fair Barbarian," and it is worthy of remark that both are drawn by British writers, seeing that these are so often reproved for seeing nothing to admire in their transatlantic cousins. This canal terminus has a good deal that is picturesque about it.

The Memorial Theater is a lasting monument to the public spirit and munificence of the late Charles Flower. But for him and some of his friends we might possibly have parted with the birthplace itself to Barnum or some other speculator in the show line.

In passing from the Market to the places just named we omitted to notice the view down High Street, the principal street in Stratford, and in which may be seen some fine old houses.

The photo of High Street was taken during a heavy shower.

Connected with the Guild Chapel is the Grammar School where Shakespeare was a scholar.

The Guild Chapel is exceedingly picturesque. Its doorway is admirable.

Most visitors, I may say, all intelligent visitors, will look with

An Arch of the E. & W. Junction Railway

interest at a house on the right, near the end of High Street, a house marked by the profusion of flowers in all the windows, for it is the present home of the illustrious authoress, Miss Marie Corelli. With uncommon warmth of heart and amazing energy, this lady takes her share of work in the local interests of the place, and, though a comparatively newcomer, exerts already a weighty influence in its councils.

Passing the church and just before crossing the footbridge, I saw some men repairing a mowing machine that had gone wrong, and fancy that, with their surroundings, they make a pretty picture.

On the other side of the footbridge one may find the Avon paintable at every six yards.

Stratford Church

The youth in the next illustration complained to me that the scene represented had no background. It is my impression that his artistic terminology was not very assured, and that he really meant "foreground." His graceful figure helps my foreground considerably.

In this matter the sketcher is better off than the photographer. There is a sluice-gate on the right of my last plate which, with a dense growth of water plants under it, makes a splendid foreground for those artists able to paint it. But in photography it and the church can not be got in on one plate.

My last illustration is that of a picturesque house at Wilmcote, near by, that with considerable other property appears to have belonged to Shakespeare's mother. It is pleasant to know that the man who did so much for the edification and entertainment of his race had himself a fairly long enjoyment of all that ample means could command.

Old House at Wilmcote,
Inherited by Shakespeare's Mother

THE INVISIBILITY OF THE OBVIOUS

By E. M. Hulbert

(Illustrations by the Author)

ONE of the peculiar features of photography is the invisibility, or rather, the lack of appreciation by the operator, of objects so close to the camera as to be wholly out of focus. When focusing, one usually has a clear perception of the object focused upon, and which it is desired to photograph, but other things foreign to the subject, lying at a closer range, are frequently unnoticed until development, when the astonished photographer sometimes finds a gigantic blade of grass, branch, or similar object almost wholly bisecting the plate. In the example of the pretty watercourse and bridge, the picture-taker was quite oblivious of the branch that nearly covers the lower part of the plate until it was developed, and what promised to be a fine picture was spoiled.

Another case of the invisibility on the screen of disturbing elements in the picture is often found in distant objects that on the plane surface of the photograph assume strange conjunction with objects near by. The scythes hanging on the remote woodshed did not seem at all out of place or disturbing to the man back of the screen, but when reduced by the camera to the flat surface of the print they seem implanted as a pair of pseudo-antlers on the man's shoulders.

Other instances will recall themselves to almost every photographer, as where a post in the background may seem to emerge

from the head of some pretty girl or the distant tree appear as a fantastic addition to her headgear.

The remedy for this condition seems to be the habitual exercise of a constant care in searching for intruding objects in the foreground and disturbing elements in the distance. In a short time this habit of close observation becomes fixed and as much a matter of routine as drawing the slide or setting the diaphragm.

FASHIONS IN PHOTOGRAPHY

By M. W. Thompstone

FASHIONS in photography—impossible, you say, but if the matter is gone into more closely you will very soon find that, like almost everything else, fashions—or, perhaps more correctly, styles—exist in photography. What is the favorite one year is replaced by something different the next.

I have lately been trying to obtain certain results with different papers, and in my attempts to secure certain tones in the resulting prints the above title suggested itself to me on which to write a few words for this year's Annual.

Going back to the early days of photography we find that, so far as regards processes, the choice was very limited, and beyond the different shapes and sizes there was really no choice; but as matters progressed, and new processes made their appearance, people began to pick and choose according to what was considered the mode of the moment.

New methods of making different fabrics caused changes in materials for dress, and a hat or a dress that is fashionable one season is thrown on one side the next; so we find it is as regards photography.

A great personage, a leader in society, has her portraits taken in a certain style, and because so-and-so has had it done every one who is anybody must do likewise. With what result? The style becomes so common, owing to its imitation, that another change is sought after.

A well-known firm brings out a new style of photograph, different from the ordinary as regards tone of print, shape, or mount, and if it meets with public favor it becomes the fashionable style of the hour.

Even in ordinary landscape work we have the same results. Mounting and framing are affected in the same manner, and change from time to time as regularly as the swing of a pendulum.

Yes, like everything else, photography has its fashions: we tire of one, we find something to take its place; that, again, is relegated to the background, and another steps into the first place. Continual

Engraved by *By W. H. Partridge*
Photochromotype Engraving Co.,
Philadelphia, Pa.

A STUDY.

change, minute detail gives place to fuzziness, plain silver to enameled printing-out paper, platinotype and carbon, gum-bichromate, etc., etc. All have their day, and alter and change, change and alter, according to the feeling of the hour.

THE RAMBLER

By Harry B. Mason

HAVING an afternoon recently in which he had absolutely nothing to do, and feeling in that lazy mood when he would have done nothing anyway if there had been loads of things demanding his attention, the Rambler strolled out and called on a number of his photographic friends. In this way he passed a very pleasant afternoon and came back to his dinner with a real appetite and with a renewed zest for the things of life.

One of his friends had just got back from his annual vacation. (For this is being written, mind you, in August, though it is quite likely to be read in the cold months when vacations are quite out of order.) Well, the Rambler's friend had spent a month in the most delightful manner possible—wheeling among the famed Berkshire Hills in Massachusetts. He is a tall, athletic fellow, about twenty-five years old, and full of the enthusiasm and vigor of healthy youth; and to hear him tell all about his tour was nearly as good as taking it oneself. And then, too, he had made scores of exposures. Some of these were yet in negative form, others had been printed, and the room was filled with them, scattered all about in delightful confusion. Here was a snap of the party drinking "pop," with the bottoms of the bottles looking skyward, and the fluid running down stretched necks—necks without any collars or other ornaments. Over there on a table was a print of a beautiful valley—such a valley as can be seen only in the Berkshire district—with a graceful creek, lined with the most perfect willow growth, winding between hills carpeted smoothly with rich, green grass, and adorned, here and there, with maple, oak, evergreen, and other foliage, the whole suffused with all the atmospheric charm of a hazy, dreamy August day.

Well, it is scarcely necessary for the Rambler to say that his friend had the most delightful set of pictures giving an illustrated history of a most delightful trip. The Rambler remarked this to his friend.

"That's it—you've just expressed it," his friend replied. "I didn't realize until I got home and came to develop my plates that I had so many of them, and that they gave so complete a view of the trip. Why, if they were arranged in regular order, they would

almost give a panoramic view of it. Every charming bit of scenery that we saw, every pleasing piece of winding road along which we passed, every village street that we rode through—all these I have, and to look at them is to take the trip all over again. Then, too, I have twenty or thirty snaps of the party, in all sorts of positions, and surrounded with every kind of scenery. Some of them are comical, some of them serious, and they all give just as complete a pictorial history of our good times as the other negatives do of the places we visited."

The Rambler was enthusiastic. "By Jove," he remarked, with characteristic pertinency and discrimination, "isn't this fine—simply elegant!"

"Yes, it certainly is," replied the Rambler's friend; "and I'll tell you what I am going to do. I'm going to make five sets of prints—there were five of us in the party, you know—and then take these and make five souvenir books of them. It will mean lots of work, but it will be worth it—besides, it will be pleasant work, too, for it will be like going over the summer's pleasures again. I can be living it all over a good deal of the winter, you see.

"My plates are all 4 x 5's, you know, and I am going to get some nice, leather covered books, about 6 x 8, or even a bit larger, so that I shall have good margins; for margins, I think, add much to the appearance of a print. Then I shall put the print on the left page, and a brief description of it on the right. What do you think of the idea? Belle, you know, is clever with her pen, and I'll have her write the descriptions. She'll be able to wax sufficiently poetic over the charming bits of nature, and humorous over the funny pictures of the crowd.

"In this way we shall have not only a pictorial history of the trip, but a written history as well. Then, to make the thing complete, I'll have Belle write a preface, describing the trip, mentioning the people who took it, and giving other information that would make the book self-explanatory, and enable people who were not of our party to peruse the thing with pleasure and interest."

"It seems to me there is only one thing you lack," interjected the Rambler at this point. "If you only had somebody who could make a pen-and-ink design as a sort of border around the prints, it would add much to their appearance, I think."

"What a happy idea! Why certainly it would, certainly! Why didn't I think of that before? Harry Thayer—who went with us, you know—is very clever at drawing, and kept us continually amused by his facetious creations. I'll just speak to him and let him try his hand, anyway. I think he'll be able to do it up to the Queen's taste. A capital idea, by George!

"I think the books will be a great success. It *will* mean work, though, won't it? But, then, I don't care. I'll enjoy it. This vacation is by long odds the most pleasant one I ever had, and to have it reproduced in such shape that I can live it all over again will be a

Winter Landscape *By Mrs. Rowland B. French*

great delight. What do you think of it? Don't you think the idea is simply *great?*"

Of course the Rambler did. He thought it was as clever an idea as any of his photographic friends had ever put into practise, and one, too, that was sure to yield a large and continuous fund of pleasure in the years to come.

ELECTRIC MARKS ON CELLULOID FILMS

BY J. GAEDICKE

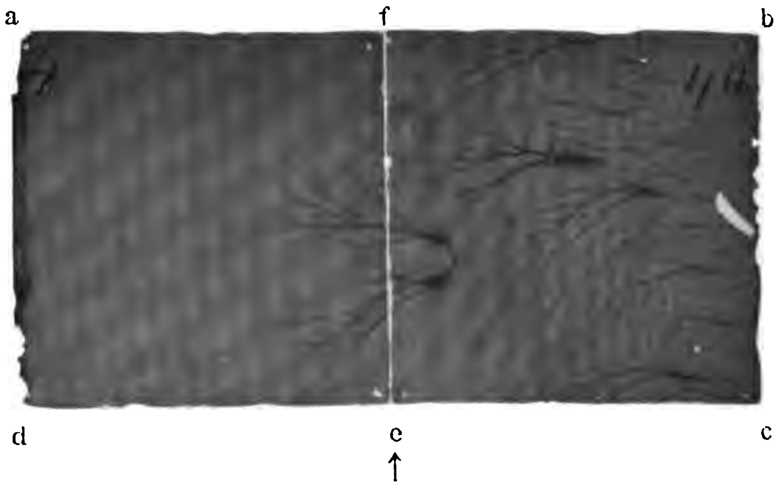
(*Translated by Henry Dietrich*)

CELLULOID films have sometimes shown, particularly during the early time of their introduction, odd-shaped figures and lines whose origin, to judge from their forms, could only be ascribed to positive electrical discharges.

An observation of the artificial production of this appearance in a mechanical way, which at the same time furnished proof that, in addition to the markings of positive electricity, evidences of negative electricity have also appeared, deserves to be made known. The appearance can be developed by dividing a package of films in two halves with a rapid and strong cut. One half will then show during development upon all sheets, the Lichtenberg figures of positive electricity, while the opposite edge, parallel to the cut, shows the glim discharge of the negative electricity. The experiment was conducted as follows:

From roll films of the Berlin Aniline factory, which had proved to be excellent for views, I cut 5 sheets 6.12 cm., and marked them on the corners of the upper long side with the numbers 1 and 1*a*, 2 and 2*a*, up to 5*a*, to distinguish both halves. One of these sheets is shown by the adjoined figures, *a b c d*. The sheets were placed one on top of the other, film downward, and with a rapid and strong cut from a card-cutter, cut in the middle line *e f*. The cut commenced at the point *e* and the knife touched first the celloidin film of sheet 1. The sheets 1 to 5 and 1*a* to 5*a* were then together developed for ten minutes with 1 c. c. rodinal, to which were added 60 c. c. of water and 6 drops of bromide of potassium solution 1:10. Upon all sheets on the sides marked with *a* there appeared Lichtenberg figures, similar to those on the adjoined cut, which represents 4 and 4*a*. Every sheet shows a different design, and is therefore independent from the others. The edge *a d* shows on all sheets the discharge of the negative electricity as double black lines without branching off. Strange to say the film frilled on this edge and peeled off to some extent, while on all the other edges the film adhered to the support. This appearance must undoubtedly be

ascribed to the discharge of the negative electricity. To avoid electrical appearances when cutting the sheets from the film roll, each sheet 6 x 12 cm. was separated with a very slow cut. During development the picture with the odd-shaped figures or lines was not visible on the surface, but only from the celluloid side, and as it appeared only after the whole film had been penetrated by the developer, it follows that the electrical exposure must have taken place from the reverse side—that is, between celluloid and gelatine film. Another remarkable appearance is that the odd lines of the half marked with *a* extended beyond the cut line to the other half. The discharge had therefore taken place before the cut was made, and as this extension is very near to the edge *c d* the discharge must have taken place in all the sheets when the knife just



touched the package, therefore in an extremely short time. In the cut line, near the point *f*, one can see a reversed 5, surrounded by a circle like a ring around the moon. The sheet 4, with the reversed side on top, has evidently laid under another sheet when the number 5 was written on the latter. The pressure of the pencil gave a picture, and around the same a circular electrical discharge has taken place. The electrical appearances seem, therefore, to be general, if two film sheets are suddenly pressed together and are then separated again. The drawings of the reversed number 5 and of the discharge circle are so delicate that it may not show when reproduced. As film rolls are now introduced without a protection of black paper, these observations may become of some importance.

PHOTOGRAPHS IN COLOR

By Romyn Hitchcock

IS it anticipating too much to predict that it will be but a few years before we shall be making photographs in colors? The subject is one in which all should be deeply interested, and while skepticism is justified by experiences of the past, we should also recognize the fact that a beginning has been made, and that slow progress in the early stages of a new discovery or invention often leads to surprisingly rapid development after a certain point has been passed. I have recently received a specimen lantern slide from my good friend Mr. Gayton A. Douglas, of Chicago, made by the McDonough process, which is a sure indication of great possibilities in this direction. Theoretically the process is all that can be desired. Practically the difficulties seem to be purely of a mechanical nature, and principally, if not wholly, in the production of the ruled plates or screens, with lines so fine and close as to be indistinguishable without critical inspection.

Spring *By J. H. Field*

Having progressed this far, we can not believe that further improvement is impossible. It seems almost inevitable that finer rulings than we have yet seen will be made. But, taking the pictures as now made, one forgets to notice the minor imperfections while impressed with the brilliancy and delicacy of the colors, which the process portrays so successfully and truthfully.

The writer has followed the gradual development of this process from the beginning with deep interest. The wonderful mechanism which enables fine lines of three colors, red, yellow, and blue, to be ruled with such extreme accuracy, in contact but without running together, and covering a large area without a break or imperfection, is marvelous.

Unfortunately, the cost of an equipment to work this process, particularly for large plates, is at present considerable, and although the manipulation is not difficult, it requires care and skill. But the results are well worth all the time and effort.

A single negative is made with a ruled color-screen, from which glass positives are printed in the ordinary way. When these positives are mounted with a ruled color-screen corresponding to the first, the colors appear. If daylight were always of the same quality as regards the relative proportion of the different colors and their photographic action, the taking of the negative would be a simple process; but since the light is changeable, it is necessary to interpose a correcting colored medium at the lens. But I do not purpose to

The Windswept Coast — *By Henry Troth*

describe the manipulation processes. The complete outfit is adapted for all contingencies.

I have referred particularly to glass positives, because these seem likely to first attract most attention. But prints can also be made on paper which has been ruled with the three colors. I have some such prints, made long ago, but improvements in this direction are under way, and it is believed that the process will eventually be made applicable to the production of colored prints by the printing press, a single impression yielding a picture in colors.

For scientific work the process as it is to-day possesses a value which is not yet recognized. The geologist, for example, frequently

ASTOR HOUSE

POST-OFFICE

Engraved by
Gatchell & Manning,
Philadelphia, Pa.

By Geo. P. Hall & Son
New York

BROADWAY, LOOKING NORTH

wishes to show stratifications or formations which, by reason of colorations, are clear to the eye, but in an ordinary print they are reduced to a uniformity of tone which renders them far less distinguishable. With a camera equipped with a plate ruled with the three colors, and the light filter at the lens, the negative could be made without much extra labor, and the results would certainly be gratifying.

It is only a reasonable expectation, therefore, when we predict the early popularity of photographs in colors made by this process, or possibly by some similar process, from a single negative. For some reason we hear but little of it. Perhaps those who are perfecting it, and who have been steadily experimenting for years without any blowing of trumpets, are preparing a surprise for the skeptical. They must have considerable confidence in the future of the process, for the work has involved much skilful labor and a great deal of ready money. Mr. McDonough, whose sudden death caused a long interruption in the work, had spent many thousands of dollars in experimenting, but his energy and faith were unbounded.

Theoretically, the colors produced are strictly true to nature. To attain this result the three colors must be exactly proportioned in their spectrum relations and absorptive powers, and this proportion must change with every change in the character of the light with which the picture is taken. Hence the necessity of the absorptive colored medium at the lens. Also the plates should be isochromatic. Considering all this, the wonderful perfection of the results bears evidence of the thoroughness with which the difficulties have been studied, and of the skill and ingenuity with which they have been overcome.

PHOTOGRAPHY FOR RECORD PURPOSES

By C. H. Bothamley

THE value of photography as a method of picture-making is a matter on which there is at present a lack of unanimity, but there is, I think, no difference of opinion as to its value as a means of making trustworthy records, whether it be of buildings or contrivances or ceremonies or persons. In fact, the increasing use of photography for this purpose must be a cause of great satisfaction to all those who care for the past and desire to leave records of our own time for those who come after us. For example, it is difficult to overestimate the interest at present, and the value in the future, of such a book as Miss Earle's " Home Life in Colonial Days," with its unique collection of photographs of things half forgotten and fast disappearing.

In England, the making of photographic records has been taken up systematically during the past few years, and we have not only the National Photographic Record Association, making a collection for the British Museum, but also various county and town associations taking charge of their own areas, and making collections to be deposited in the county or town museums. In the States, there is no doubt much valuable work of a similar kind to be done, and if the movement has not already developed, it is to be hoped that it will soon make a beginning. Opportunities are constantly passing away, never to return. Buildings of the greatest historic interest fall into ruins and disappear, or, if inhabited, are altered out of all recognition to suit the wants or whims of successive owners, or it may be that they are annihilated in connection with some "town improvements." Ceremonies of high antiquity and interest cease to be practised; the household gods of yesterday are the neglected and decaying lumber of to-morrow. We can not, in many cases, even if we would, preserve the things themselves, but we can at least preserve records of them. And every one can help who can take a decent photograph. Good photographs we want, of course, if we can get them, but a bad one is better than none at all. Let every one, therefore, who can use a camera make a point of photographing every notable building, every ancient ceremony, and every quaint household or industrial contrivance that they may meet with, and, moreover, of doing it at the first opportunity, instead of putting it off until to-morrow, which never comes. Such a habit not only adds interest to the use of a camera, but also gives rise to that comfortable feeling of self-satisfaction that springs from the knowledge that we have done something really useful.

A Venetian Mother
By Mrs. Anna K. Carruth

Every photographic record is valuable, but many of them can be made much more valuable by taking just a little trouble. Perhaps the most important is to include in the photograph something that will serve as a scale. If the focal length of the lens used, and the

distance of the lens from a particular point in the object are recorded, the size of the objects can be worked out from the photograph, but it simplifies matters if we can include a scale in the photograph itself. For large buildings we must, as a rule, be content to get an approximate scale by including in the view a man of average height, or better, two men, at different distances from the lens. With smaller subjects an ordinary foot rule, yard rule, or meter rule can be included, and should be placed close to and parallel with the main surface of the object. If this surface recedes from the lens, two rules at least should be used, both placed close to and parallel with the receding surface, but at different distances from the lens. In this way we at once get a clew to the perspective of the picture. A scale is likewise essential when photographing weapons, armor, and other relics. Even when a scale is included in the picture in the manner indicated, it is always desirable to record the focal length of the lens

On Shasta's Slopes *By W. J. Piatt*

used, as this indicates the distance at which the photograph should be viewed. A record of the date on which the photograph was taken is also important.

The prints must be permanent, either platinotype or carbon, though photomechanical prints in permanent printers' ink are equally valuable. Negatives on gelatinobromide plates, it should be remembered, are only permanent under certain conditions, and valuable record negatives should invariably be made thoroughly dry, and while thoroughly dry, and preferably hot, should be varnished with some good atmosphere-resisting varnish. In special cases a transparency should also be made and carefully stored, so that the negative can be reproduced if it should by any accident be broken.

AN HISTORIC QUEST IN TAPPAN

By Miss Adelaide Skeel

(Illustration by the Author)

"THERE'S not a month in the year, hardly a week in the month, that some one does not come here to ask about Major André," said mine host of the old '76 Stone House at Tappan, adding as he saw our cameras, "the picture-taking folks and the writing chaps get all they can from me and I never charge a cent."

The magnetic personality of André has made him the most pitied man in the whole drama of the American Revolution. Nathan Hale, the spy on the side of the Continentals, was less of an egotist, and for this reason compels a higher respect, but no more loving sympathy. Hale regretted he had but one life to give for his country, André called the world to witness that he died like a brave man.

No historic pilgrimage can lack interest which has in it the elements of strong human emotions, and to see Maby's tavern, where the unfortunate tool of Benedict Arnold's treachery was imprisoned, to visit the site of the church where he was tried, and to climb the hill where he was hung, led us to quiet Tappan, a village on the Hudson scarcely more important to-day than it was over a hundred years ago when these stirring events took place. It is a pity that no patriotic society will buy the tavern where the signs of fresh ale and ice cream mar the appearance of the piazza as viewed historically, but a tavern it has always been and a tavern it is, and probably a tavern it will remain unless visited by Mrs. Nation.

There is something humiliating in taking one's history second-hand, yet the description given in "Hugh Wynne" of this place defies betterment.

"I can see to-day the rising moon, the yellowish road, the long gray stone farm-house, with windows set in an irregular frame of brickwork. The door opens, and I find myself in a short hall where two officers salute as I pass. My conductor says, 'This way, Captain Wynne, and I enter a long, cheerless-looking apartment, the sitting-room of a Dutch farm-house. . . . A huge fire roared on the hearth, so lighting the room that I saw its glow on the bayonet tips of the sentinels outside as they went and came. There were a half dozen chairs, and on a pine table, four candles burning, a bottle of Hollands, a decanter and glasses. In a high-backed chair sat a man with his face to the fire. It was André. He was tranquilly sketching with a quill pen a likeness of himself. . . . The prisoner turned, and I was at once struck by the extreme pallor of his face, even as

seen by the red light of the fire. His deathlike whiteness at this time brought out the regular beauty of his features as his usual ruddiness of color never did. I have since seen strong men near to certain death, but I recall no one who, with a serene and untroubled visage, was yet as white as was this gentleman."

Here is a word picture. Let those who read history by the searching of dry land papers and records scoff as they will. History without adjectives is meat without salt to me.

"The man who wrote 'Hugh Wynne,'" said the tavern keeper with pride, "he stood where you stand and *saw it all.*"

Genius always sees it all. We, who are just common folk, saw only the long room, the fireplace, the windows, the low ceiling and

House where André was Confined
At Tappan, N. Y., September, 1780

the homely modern accessories of a road-house, yet the familiar story seemed written on the walls. The noise of the men drinking across the hall grew faint, the real André stood before us, the hapless lad, unlucky in both love and war, who, when taken prisoner at St. John on the Sorrel, wrote to a comrade, "Stripped of all I possess, I think myself fortunate in preserving the picture of Honora, which I concealed in my mouth." Honora was the girl whom he loved hopelessly. Possibly, these hours at Tappan, when his life was at its close, were not the most miserable he had ever known.

The tragedy of André lasted from September 21, 1780, to October 2 of the same year, and the incidents group themselves in a

half dozen scenes. There is the fatal interview with Arnold in the woods near Stony Point, the breakfast at Joshua Smith's house, the sloop Vulture crossing the Hudson, the capture by Paulding, Williams and Van Wart at Tarrytown—this last, familiar on the walls of every house a half century ago in the old engraving—the imprisonment at Tappan, the trial in the church when those stern officers, Greene, Steuben, Howe and others gave the fatal verdict, Washington deliberating over the sentence in the headquarters close at hand, and last, the misty morning on Gallows Hill at the spot now marked by a granite monument.

After leaving the '76 House we strolled over to Washington's headquarters, a house standing in well-kept grounds with an attractive garden about it. The front is of wood, painted white, of curious architecture, with its double piazzas and many decorations. As it gleamed in the sun, the temptation to get a view was irresistible, although we knew the rear was the only part standing in Washington's time. The place was originally owned by John De Windt, and by a cipher on its walls the date of the erection of the mansion is known to have been 1770. Here Washington wrote one of his memorable letters. We know what it cost him to write it, for he loved all young men, and André was in the flower of manhood.

"Headquarters, September 30, 1780.

"The Commander-in-Chief approves of the opinion of the Board of officers respecting Major André, and orders the execution of Major André take place to-morrow at five o'clock P.M."

André has been long dead, so we climbed the hill which still bears the awful name of Gallows quite cheerily, and stood on the dividing line between the States, quarreling as to whether the mosquitoes were from New Jersey or from New York, which so tormented us as we stood among the weeds to read the inscription on the monument Cyrus W. Field erected on the site, a monument which misguided patriotism so many times tore down, and which the generous donor so patiently rebuilt. If we had tears to shed, we found at our feet the wild carrot, Queen Anne's lace handkerchief, growing in plenty with which to wipe them away. Here André swung in air, having been denied the honor of a soldier's death.

A memory came to me of another tablet to André's memory across which I accidentally stumbled in Westminster Abbey a few summers ago. It is in the Poet's Corner, and was a surprise to me only because I had not read my guide-book with sufficient care or given due attention to historical studies. The shock of seeing the slab brought back with a rush the awful treachery of Benedict Arnold, and for a moment I almost grudged poor André his honored resting-place. Here he was with the memories of our Longfellow and other noble Americans. Had he a right to be there? And was he there? This removal of bones from one place to another is a gruesome business which the early Fathers of the Church called translation. I question if we can translate a spirit as a body from

one land to another. André is ours, we love him, and we pity him. His soul, if it ever returns to earth, comes back to Gallows Hill. I am glad Field's monument is there.

Inscription on the monument—north side:

HERE DIED OCTOBER 2ND, 1780.
MAJOR JOHN ANDRE OF THE BRITISH ARMY.
WHO ENTERING THE AMERICAN LINES
ON A SECRET MISSION TO BENEDICT ARNOLD
FOR THE SURRENDER OF WEST POINT
WAS TAKEN PRISONER, TRIED AND CONDEMNED AS A SPY.
HIS DEATH, THOUGH ACCORDING TO THE STERN CODE OF WAR
MOVED EVEN HIS ENEMIES TO PITY
AND BOTH ARMIES MOURNED THE FATE
OF ONE SO YOUNG AND BRAVE.
IN 1821 HIS REMAINS WERE REMOVED TO WESTMINSTER ABBEY.
A HUNDRED YEARS AFTER HIS EXECUTION
THIS STONE WAS PLACED ABOVE THE SPOT WHERE HE LAY
BY A CITIZEN OF THE STATE AGAINST WHICH HE FOUGHT,
NOT TO PERPETUATE THE RECORD OF STRIFE
BUT IN TOKEN OF THOSE BETTER FEELINGS
WHICH HAVE SINCE UNITED TWO NATIONS,
ONE IN RACE, IN LANGUAGE AND IN RELIGION,
WITH THE EARNEST HOPE THAT THIS FRIENDLY UNION
WILL NEVER BE BROKEN.

Inscription on monument—south side:

SUNT LACHRYMAE RERUM, ET MENTEM MORTALIA TANGUNT.
Virgil's Aeneid, Book i, Line 462.

Inscription on the monument—north side:

HE WAS MORE UNFORTUNATE THAN CRIMINAL,
AN ACCOMPLISHED MAN AND A GALLANT OFFICER.
George Washington.

ARE PHOTOGRAPHERS ARTISTS?

By H. W. Hales

MUCH has been said and written as to whether the title of "artist" should be used by photographers in writing or in advertising their business, and it is not the intention of the writer to enter into any discussion on the subject, as the matter seems to be too plain and simple to be worth the time discussing. How often do we hear Mr. Pyro, the professional, ridiculed for calling himself an artist when his showcase and

By W. N. Brenner

studio are filled with samples of work that are not only inartistic in execution, but the mounts and frames used often show a lack of even ordinary good taste and judgment. We often also find the amateur showing a lot of work and calling it good, when it is frequently not only devoid of all artistic merit, but often shows a lack of the first principles that are in use by nearly all artists the world over. It must, however, in justice be said that the examples given above are getting less very rapidly, and photography is now reaching such a plane that the public demand, and are getting, a very superior style of work to that of a few years ago, and although we yet have many photographers that can scarcely be said to be artists, yet the number is growing less every year, and it will not be long before photography takes its proper place as a fine art, if our workers continue to improve as they have done in the last few years. The question, therefore, " Is a photographer an artist " must be decided by his work.

Send two men out to photograph a landscape some time and then note the result. One goes out with his camera, makes his exposure, develops his negative, and turns out a plain, matter-of-fact every-day photograph. The other first goes out and studies the conditions, light, etc., and everything that can be brought to bear to make not only a good technical photograph, but an *artistic one,* and although he takes practically the same view, the result is entirely different. Let us again suppose two professional portrait photographers. One gets his sitter in a chair and takes him in a hurried, careless way, perfectly indifferent as to his pose, and the sitter not having his (or her)

Apple Blossoms By R. Stockton Hornor

Engraved by
Baltimore Engraving Co.,
Baltimore, Md.

By Geo. W. Payne

THE SENTINELS.

good points brought out, has a constrained or awkward look that is not at all like him in daily life—it is a mere matter-of-fact photograph.

Another man, however, in taking the same sitter will perhaps exchange a few pleasant words with him in order to get his best expression, and while he does not change his features, he simply brings out the live, soulful, animated look that almost every type of person possesses if only the right means are used to get it. To answer the question, therefore, at the head of this article, the writer will simply say that the first of those above-mentioned are photographers, while the second ones are artists.

THE ELEMENT OF THE BEAUTIFUL IN PHOTOGRAPHY

By W. M. Stine

NO one can forget the rapture and high enthusiasm of the first negative. Fortune smiles so benignly on many of us when we first dare her pleasure with lens and plate, that the negative she grants us often remains one of the best in the entire after collection. In my own experience it was a weighty moment when I focused the camera on a beautiful bit of familiar landscape for that trial negative. The image on the ground glass was as sharp as the lens was capable of making it. I studied the light and, it seemed, timed the exposure correctly. Then came those few moments of tense and strained anxiety while the developer was coaxing the hidden picture into reality. First a mere dot, and then a suggestion of a haymow, or what not; and at last, the real picture came into being right before my enraptured eyes. After this enthusiastic experience had grown into memory for one day, there came the only less exciting one of making the first prints. My first trials were a pronounced success, not so much because of the smiles of Fortune, but on account of the kind supervision of one of the greatest of our scientific photographers.

Some fifteen years have passed since this photograph was made, and something of the glow and life it then seemed to possess has left it. As the negative is still perfect, the freshest prints from it do not compare in glow with those made at first. I can find little to criticize in it photographically. With the same lens I am doubtful if I could surpass it now, with the added skill and experience of subsequent years.

I have enlarged at length on this personal reminiscence for the expression of a feeling that has been slowly developing toward my own collection of prints in particular, and other collections which I examine from time to time. While the early enthusiasm of the

espousal of the art was still upon me, I could find little to desire beyond a negative which was well lighted, and filled with detail that was distinct to the smallest leaf on a distant tree. I was the enamored slave of the lens. I thought it the very virtue of truth in a print, that it showed with unrelenting severity every scratch and crack on the side of a house.

Now I find myself treasuring my prints more for their associations with friends and familiar scenes than any inherent charm or photographic merit. In my collection are negatives made with the best of lenses, which were perfectly adapted, in the language of the art, to the purposes for which they were used. Photographically I acknowledge that the results are perfectly satisfactory, and that dry plate, lens, developer, and paper have kindly given me response to their best capability. But yet I am no longer satisfied with the results.

By L. L. Howe

I would not be so frank with my dissatisfaction, if I did not find a general tendency to share in it. I believe that it is the enthusiastic amateur with the camera who has revealed to me the source of my discontent. Many of these amateurs are intelligently grounded in the correct appreciation of the beautiful in art. They have the insight which enables them to read a painting aright; and they take up photography, not to photograph a favorite horse, but from an appreciation of its aesthetic possibilities. And these persons are teaching the scientific and professional photographers that there is a lack of real beauty and even something of ugliness about their art.

If one is a sincere lover of the camera, it is always a source of great pleasure to look over a collection of photographs that have been well executed with appropriate apparatus. One can not fail to admire the action of a good lens, and the skill shown in its handling, and the subsequent treatment of negative and prints. But aside from this, each collection proves something of a disappointment, and one turns away from it dissatisfied.

This tendency, I think, can be seen clearly in portraiture. For the last few years especially, the portrait has been in a condition of uncertainty. It has not been sure of itself, but has wandered from one type to another. Something of this may be charged to the printing-out papers and processes, but most of it has been in the negative.

Something of this has been due to a desire for mere novelty, but this is so readily detected from its very lack of point and aim, that it does not affect the general principle. If one were to characterize these tendencies in portraiture, it would be to remark them as efforts to get away from the almost cruel distinctness of detail that is inherent in a good negative. Many photographers have attempted with the camera to reproduce the effects of the painted portrait; and the resule has been all degrees of shadowed obscurity and patchy lighting.

The magazines have lately, in an unwitting way, illustrated this tendency most admirably. In one periodical before me there is published a series of half-tones from prize photographs; and it may serve as a text. One scene is a blacksmith standing in the door of his smithy, with two children in the foreground. Waving all questions of pose, the picture lacks inherent beauty from its failure to differentiate the tones of low lights, and from the excessive sharpness of such portions as were in exact focus.

By D. D. Spellman

In another, there is a figure in a landscape, and the exposure was evidently made so short that it purposely kept the background indistinct. This is well enough in intention, but the camera has produced little beyond an impressionistic blur. A weak image in the focus is bad enough, but a weak image out of focus is an atrocity.

In a third, a flock of sheep was the motive of the photograph. The sheep had raised a great cloud of dust, and the result for the camera was a beautiful picture that is almost artistically perfect, except for some glaringly distinct branches of trees above the dust cloud.

In order to submit the matter to a crucial test, select a half-tone or solar print from a painting of a landscape by an accredited artist, and compare it with one that has been executed from nature by the camera. The two landscapes should closely resemble each other in motive. Of the two, the work of the artist will no doubt prove the more satisfying and suggestive. This is by no means due to the fact that a painter usually idealizes, but rather that the artist conveys by his painting the exact sense of the beautiful. Though the work of the camera is more truthful and exact, except for exaggeration and distortion, it is unnatural in that it does not yield us the im-

pression of the beautiful which we get from the landscape itself. I have suggested the test with the photograph of a painting in order to eliminate the influence of color; though a skilled photographer should have little or no difficulty in reading a monochrome picture correctly.

The photograph, in brief, of a landscape for instance, seems usually to lack much of the real element of beauty. This fault, if it is conceded, lies both in the action of the lens and the sensitive film, but more especially in the lens. If the leaves of a tree, for instance, are in actinic focus, they affect the plate in such a way that it will reproduce the tone values of the lighting. But if they are not in focus, much of the tone value in the lighting is lost, and that portion of the picture tends toward fog in weak lights and patches in strong illumination. In order to obtain the full tone values of the lights. the focus must be sharp, or, what amounts to the same thing, the lens should have great depth. But the pictorial result offends the eye because of the sharpness and the distinctness of the detail.

We must not forget that most of the beauty of a landscape, and the merit of a painting, is subjective. It is the imagination which must be quickened. If minute details are presented to the vision to a considerable depth, the whole becomes objective, and to a degree, commonplace. If the camera leaves nothing to the imagination, the individuality within us is offended, and the picture is disappointing.

As I look toward a grove of trees, distant a few hundred feet, I am charmed with its beauty and suggestiveness. I am conscious of outlines, rather than mere sharpness of details. No one leaf is clearly defined and distinct. But I am conscious of an almost infinite gradation of light and shade, or of high and low lights, and tone values. In this way the trees appeal to me. I see, as it were, my own trees, and not an objective identity of trees.

The photographic problem of the truly beautiful, as I take it, is to accomplish this same result with optical apparatus. I say optical, for the dry plate is fairly capable of the necessary tone values and gradations. The ideal lens for the photography of landscapes, especially, though this holds true in portraiture as well, would yield full differentiation in the lighting when slightly out of focus.

But some real progress can be made in the present state of the art. If a negative is sharp in its details, and yet soft, a slight separation from the paper in printing will diffuse the light and soften the sharpness of the detail. A thin, transparent film will usually accomplish this, especially if a diffusing plane of tissue paper or ground glass is placed back of the negative.

STEREOSCOPIC PHOTOGRAPHY WITH THE HAND CAMERA

HOW TO DO IT AT SMALL COST

By Nichol Elliot

(Illustrations by the Author)

WHAT a small proportion of the great army of photographers, and especially hand-camera workers, go in for stereoscopic work. Go where one may to the places where snap-shotters throng, it is on very rare occasions that one notices a stereoscopic hand camera in the crowd. That a stereoscopic photograph is, in general interest, far and away before one taken with the ordinary single-lens camera, one hardly needs to argue—a look through the stereoscope will convince any one possessing a good pair of eyes on that point. What huge numbers of photographs are produced daily which have no interest for any one save the photographer, and very often none for him either. This would not be the case if the stereoscopic hand camera was in more general use. To give this charming branch of the art a trial, it is not necessary to go to any great expense, and the skill required is little if anything greater than that required for ordinary photography. There are various forms of small and cheap hand cameras now on the market which, when a pair of them are used, can be made to turn out excellent stereoscopic pictures. The cameras I refer to take a small picture about two and one-half inches square. I will endeavor to give simple directions for working a pair of these cameras.

In choosing your cameras it is necessary to see that, when fastened together, side by side, the distance between the centers of the lens openings does not exceed three inches, two and seven-eighths is a good distance for average work. It is not probable, but should the distance be less than this, cardboard can be introduced between the cameras to bring the lenses to the proper separation. The cameras can be strapped together with a pair of small belts, a handle being attached for carrying. In making the exposure it is necessary that the shutters work together. To accomplish this, a hole should be drilled in the projecting part of each release and a connection made with a piece of wire. Another method is to hold a piece of soft wood on the ends of the releases. Whatever method you adopt you must experiment before making an exposure, to see that the shutters work exactly together. Time exposures can easily be made by resting the cameras on a table or any other steady surface.

Although it is not indispensable, a view-finder is a great convenience; one of the brilliant type attached to the top of one of the cameras is what is wanted. To be really effective a stereoscopic print should have a good foreground, at least some object fairly near the camera, and this must be borne in mind when selecting the point of view.

When removing the plates or films from the camera be careful to mark one series of exposures, say with an R for those taken from the camera on the right side. It may be found convenient to develop twelve exposures at once, six from each camera; in any event each pair of exposures must be developed together, so as to get both negatives of the same density. For printing from the negatives prepare a black paper mask in the following manner: Cut two openings in the paper of such a size that the unexposed edges of the negative will be masked off, the openings must be perfectly parallel with each

other, and the distance between the centers of the two openings should be two and seven-eighths inches.

Each pair of negatives are to be attached to a mask, being careful that the negative marked R is fixed on the left-side opening. A dark margin is a great improvement to a stereo slide, and does not require much extra trouble. When the openings in the mask have been carefully cut, do not remove the pieces, but spread a little gum over each one and lay a piece of glass, the full size of the mask at least, over all. When time has been given for the gum to set, remove the glass with the pieces adhering to it. When a print has been made from the negative it is an easy matter to adjust the black squares over the pictures, and then the margin can be printed as dark as is wanted, no printing-frame being necessary. When toned and dried the prints can be trimmed to suit the ordinary stereo mount. The foregoing method of masking is especially suitable for films. When plates

are in use, first make a carrier from thin cardboard. Two pieces are necessary; one piece with openings slightly smaller each way than the negatives, and the other with openings into which the negatives will fit easily; then glue both pieces together. Of course the openings in the carrier are cut according to the directions given for the mask. Now, make a mask from very thin black paper, adjust it carefully on the back of carrier, and fix it at one end with gum. For printing, the negatives are laid in their respective openings and the mask is folded over the film side.

The slide reproduced was taken with a pair of five shilling film cameras, and is only a moderate specimen of what can be done with them. I trust that not a few of our hand-camera workers may be induced to give this most interesting branch of photography a trial.

THE FOCAL DISTANCE OF AN ENLARGEMENT

By Commandant V. Legros

PHOTOGRAPHS made with objectives at an angle which is too great, and having too short a focus generally, receive well-grounded criticism, as in most cases the people who make them do so under conditions which are entirely unjustifiable and inappropriate. This question bears directly on the subject matter referred to before in this Annual, to the effect that it should be made the rule in every photographic society—violation of which rule should make the violator liable to a fine—to bring up the subject of perspective unless there be a perspectograph in the meeting-rooms.

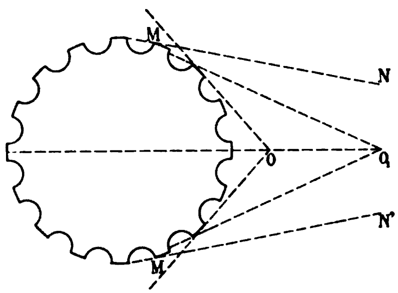
However, adhering to the statement that photographic views taken at too great an angle and at too short a focus are defective in regard to the use generally made of them, the statement will stand absolutely. The question has, however, been put to us at various instances, if, under such circumstances, the drawbacks or faults of such a photograph would not be set right by an enlargement? At first glance the question appeared absurd, but after thinking over the matter we have come to the conclusion that there are points for and against the matter at issue, and that however much might be said against it there was, nevertheless, something in it worthy of consideration.

The greatest fault of pictures taken at too great an angle, which becomes, hence, too near as regards the general dimensions of the picture used, rests in the fact that the marginal subjects appear in the photograph entirely at variance with what we consider to be the normal aspect of the view itself.

Let us assume, as a matter of example, a fluted column, as shown in the drawing, viz., a column having sixteen grooves. In

this instance the party taking the picture with a wide-angle objective placed at O would only take in four of the sixteen grooves. This will give only the perception of four grooves, and the intentions of the party having erected such a column are certainly not reproduced in the photograph. The marginal part of the image is destroyed or disfigured almost wholly.

An observer taking a view from O_1, at a distance four times greater than the central point of the picture, would gain a view of two additional grooves. When, however, the spectator recedes three or four times further, to where the straight lines M N, M^1 N^1 meet, so as to obtain a view of eight grooves, he obtains a complete representative effect of the form of the column or pillar. Hence it becomes manifest that if there is a photograph taken from point O there are only four grooves visible, and no process of enlargement can ever make eight grooves apparent. If the subject of the photograph should be a face, such face, taken at point O, would appear without ears. The assumption that by means of enlargement ears could be made to appear would be absurd indeed. On this theory it is a natural consequence that enlargement can not make up for any of the advantages which are to be found in a picture taken under more normal conditions. The enlarged copy has positively assumed a focal length which has increased precisely in the same proportions as the geometrical dimensions of all the lines that comprise it. However, the enlarged proof shows us a world that is totally at variance with our own.



The enlarged photograph might be likened to a picture taken by a follower of the Brobdignagian era, who had undertaken the practise of photography in the land of the giants with an apparatus having too short a focus.

Nevertheless, the photograph has, as a necessary consequence, a relation of the focal length to the geometrical extension. It has gained, inasmuch as the beholder is now enabled to see with the naked eye at a distance of clear vision, which was not the case before. Every photograph should, as a matter of fact, be critically inspected from a distance which is equal to the focal length of the objective with which it has been taken, and if the length of the latter is less than the range or distance of clear vision, it should be brought to its equivalent or balanced by means of a magnifying glass or convex lens having the same focal length as the object glass employed.

This essential detail is left out of consideration by the critics who dwell so extensively on the errors in photographic perspective.

Engraved by
Electro Light Engraving Co.,
New York

By Howard Rush

WINTER.

They will insist upon taking their view at 25 or 30 centimeters at an angle of 30 degrees, when they have to deal with a picture taken with an objective of eight to ten centimeters focus at an angle of 90 degrees. This advantage becomes more manifest in stereoscopic sighting. The stereoscope attains its full perfection only when its lenses are equal in focal length to the focal length of the objectives with which the photographs that it shall show, have been taken. Hence an enlargement which carries the focal length of the photograph to the length of distinct vision allows perfect stereoscopic effect in a stereoscope devoid of lenses but having only a simple black pasteboard frame which is held vertically in front of both eyes. This yields again the Brobdignagian view, but it is at least an example of correct vision.

A HIDDEN FOE

By Frederic G. P. Benson

(Illustrations by the Author)

SPEAKING generally, most of the failures met with in the ordinary course of photographic practise are evident when the process is completed, but I wish to warn my fellow-workers, especially those whose experience is not of long duration, against a most insidious foe, one which does not betray its existence, may be for years, but which is as sure to appear, sooner or later, as that night is to follow day unless timely precau-

The King's Manor, commonly known as The Blind School

tion is taken and measures adopted to insure immunity from this defect. I refer to the silver staining of negatives which is usually caused by printing from unvarnished negatives in damp weather, or in fact any operation which brings the unprotected film in contact with silver paper under circumstances where there is any suspicion of dampness. The worst of this is that the stain is not visible at the time the harm has been done, but after the printing is completed and the negative stored away. The disease is gradually progressing, and when, after the lapse of a few months, or may be years, the negative is wanted for further prints, the owner is horrified to find its surface covered with iridescent, metallic-looking patches, which by transmitted light appear as stains varying in color from yellow

The King's Manor, commonly known as The Blind School

to brown, according to the extent to which the film has been affected, and the negative is, in nine cases out of ten, irretrievably ruined. Needless to say it is always the valuable picture that can not be replaced which suffers the worst in this way.

There are a number of formulas published for the removal of these stains, but none can be termed successful, inasmuch as in removing the stain the silver forming the image is also taken away.

The only safe course to pursue is never to take more than a trial print or two from a negative until it has been protected by a coat of varnish.

The operation of varnishing, until the introduction of the so-called "cold" varnish, was certainly a messy process, and was

often productive of much "language," but the applying of the varnish with a brush presents no difficulty and should never be omitted. In any case, whichever process of varnishing is adopted, the task is no more difficult of attainment than any other of the details which go to make up the complete art of photography, and although it may not affect the quality of the picture, it is absolutely essential, if it is desired that the negatives should remain in good printing condition for any length of time.

A few particulars as to the two pictures of the "King's Manor" may be of interest. It was built after the dissolution of the monasteries by Henry VIII. on the site of the house previously occupied by the Abbot of St. Mary's, and when James I. first came from Scotland in 1603 he was entertained here. Charles I. resided at the manor for some weeks during the civil war, and also held Parliament here. Fifty years later it became a Royal Mint, over £312,000 being coined here. The York coinage was distinguished by having a small Y under the king's head. As an educational institution it was acquired in 1833, as a memorial to William Wilberforce, the philanthropist. The pupils are taught reading, writing, typesetting, music, basket and brush work, etc.

PROCESS WORK

ELECTROTYPING

By F. A. Ringler

THE electro-depositor's art is so widely disseminated over numerous modern industries that to give a concise and comprehensive definition of the compound term electrotyping is rather difficult. Its general significance, however, may be understood to imply the production of metallic copies and duplicates of objects by means of electricity.

Thus an electrotype of a wood engraving consists of a metallic duplicate, accurate in every detail. It possesses the advantage of being better adapted to printing purposes than the original.

An electrotype of a plaster bust, or a bird, or a fish, forms an accurate metallic reproduction of the original, rigid and, indeed, everlasting.

In some respects the products of this fascinating and beautiful art resemble the results of photography; every line, excellent feature and defect, is reproduced with a faithfulness almost surpassing belief. From the nearly invisible lines of the finest steel engraving to the boldest contour of a statue, the electrotype is throughout an exact and unmistakable reproduction.

Copper is the metal almost universally employed in the production of electrotypes. It is cheap, strong, and flexible, and is admirably adapted for printing purposes in many cases where various other metals and wood are inadmissible. It also presents an agreeable and attractive appearance in art productions. Electrotyped printing surfaces may be, and frequently are, so protected from the effects of wear, by means of a thin and hard facing of iron, brass, or nickel, that they may be made to yield as many as from 500,000 to 1,000,000 impressions. The "steel face" or its remains may, moreover, be dissolved off, and the process repeated without loss of sharpness or injury to the original; in this manner, the printing electrotype may be made infinitely more useful than the prototype itself.

Engraved steel plates (originals) are not now, owing to their great value, generally used in printing; electrotypes, steel faced, are taken of them and employed in the printing process; wood blocks of value are similarly treated. Set-up type is frequently in Europe, and almost universally in America, copied in electrotype, instead of being stereotyped by the old casting process. Any number of copies of one subject or plate, either from the original or from an electro-

type, can be obtained. Bank-notes, postage stamps, bill heads, illustrated newspapers, playing cards, grocers' wrapping papers, maps, and numerous other kinds of printing work are executed from electrotype plates.

In the domain of art, the application of the electrotype is no less widespread. It is employed to produce copies of the smallest medals, casts, and coins. Its application to the production of gigantic statues and ornaments may be inspected in almost every public recreation ground. It is almost impossible, and its accomplishment would prove of little use, to detail the numberless applications of the art; they are legion, and may be said to be enormously augmented in number yearly.

Clouds, Hamilton Harbor, Bermuda *By Wm. Weiss*

Having thus obtained an outline conception of the field in which the electrotyper's art is utilized, it will prove instructive to briefly examine the main manipulatory features and forces necessarily employed in its original practise. It will be well to premise, however, that electrotyping and electroplating are very closely related to each other; indeed, one is often classed with the other. They are both deposits of metals laid in position by means of electricity, but except in this main particular their application lies in totally different fields. To electroplate is to disguise with an adherent thin coating of metal, which then serve as an ornamental covering to the object treated. To electrotype, on the other hand, is to produce a separate and distinct object, with an existence of its own.

A MISTAKEN IDEA

By H. D. Farquhar

CASUAL observations taken by an interested party on the manner in which trade subjects and journalism pertaining particularly to process work are treated are amusing to workers in the United States, England, and Germany. In this country the general tendency is, and has been since the inauguration of process work, to suppress from

By Geo. F. Estwick

publication in trade journals all information pertaining to new working ideas or processes which would prove of value; all of this being done with the apparent feeling by persons acquainted with manipulations and formulas necessary to produce successful plates that such meager information would interfere with their progress, and with the general idea that every such bit of published information was necessary to make a full-fledged photo-engraver, and that if such conditions were encouraged there would be more process workers in the field than day laborers. That these ideas are gradually but surely proving to have been wrong, and as such articles have rather been beneficial than otherwise, and perhaps of greatest value to the

most strenuous objectors, is demonstrated by the fact that the market is not overstocked with capable workmen to-day. The idea that the new things daily advanced will be the last and only information ever to be born is a fallacy, and might more reasonably be considered in the light that "what is new to-day is dead to-morrow." The most successful in any trade are those who are not satisfied with the knowledge at present possessed, and who do not grind day after day on the same stone, well knowing that the stone in time will be worn beyond use; then the grinder will be compelled to seek a new one—one which he will not understand the working of, not having kept pace with the advanced ideas and working methods of the times—and he will soon be known as a back number. With all this prejudice and a general leaning toward secrecy, the American process plates are not equaled in any country, whch high standard was attained by hard work and many costly experiments. During the experimental days every bit of literature was eagerly sought that would likely throw light on the subject in hand. In those days not much information of value was published, but undoubtedly what little had been was of more or less worth to seekers of the new art. Perhaps such articles did not treat with the exact information desired, but would give a clue leading in different directions which in many instances lead to success in spite of their falsity.

In Germany and England views on the subject are the exact opposite of our American ideas. There the monthly and yearly publications are eagerly watched, and every item likely to prove beneficial is carefully noted and applied to methods already known. By such close observation and studious application the quality of work is gradually increasing, and is to-day one hundred per cent. better than a year or so ago. With all these published ideas and exchanges of opinion, the market does not appear overstocked with shops or workmen; a glance over the want columns of these publications will show many requests for good process men in all departments. The exchange of ideas toward the advancement of the trade or profession from which we are to make our bread and butter never has nor will deprive a person from bettering his condition.

ADVANCES IN PRINTING

By H. Van Beek

(Illustrations by the Author)

VOLUME XIV. of the International Annual is now in preparation. Indeed, a fine annual, admirably executed, containing a good exposition of all that is new in "process" and other photographic matters. This was our feeling in receiving the kind invitation from the editor

to tell something of what is going on on the other side of the grand waters.

Now, we will try, to begin with, to describe a new tool for the process studio, a tool on the good qualities of which largely depends the output of the printer on metal.

Do you know anything of whirlers? Yes, you do, certainly. But do you know among all the various kinds one which enables opera-

Fig. 1.

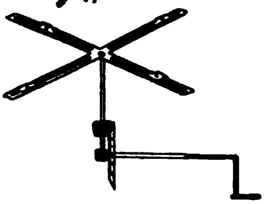
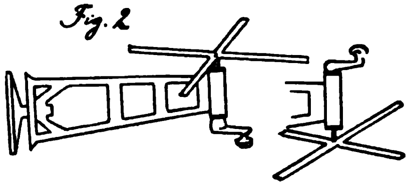


Fig. 2



ting with both hands, allowing the cleaning of the fixed plate up to the last moment before drying its coating?

That simple tool, which was introduced as the "American Whirler," is well known. I give you a sketch in Fig. 1. The printing room, fitted with this whirler, runs somewhat noisily, dust finds its way on your coating, and after all the plate may take to its heels if you do not pay the utmost attention in fixing it; you may then seek it in some corner of the studio, bent in such a manner as to be of no further use.

Fig. 3.

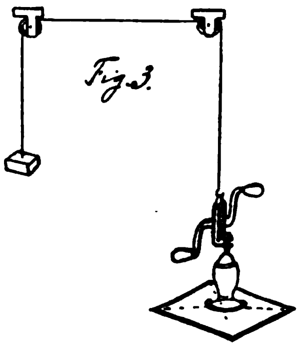
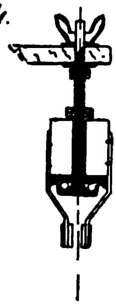


Fig. 4.



The whirler shown in Fig. 2 is a nice tool. I believe Levy, your famous countryman, constructed it. It is the best I have seen in every-day practise; the only fault I find with it is the impossibility of cleaning the plate after having fixed it in position. You feel sure that it is just this handling which sets dust and dirt in motion and allows it to settle on the clean, sticky, drying glue coating.

Fig. 3 also makes a good appearance. The only trouble I have

Fig. 5

found with it is its dependence on the good qualities of its pneumatic power. Have you had some experience with roguish process, boys? Now, we have. If you have suffered in this way you will know that only one needle-point suffices to disarrange matters for some hours at least. Further, the rubber must be of the highest standard obtainable. Just where it is wanted the rubber often becomes hard and stiff. Furthermore, your plate must be fixed just in the middle. All those tools are good, but not what we have a right to expect in our modern times of line mechanics, of up-to-date routing, beveling, shaving molds, and improvements in working conditions on tool constructions of former times.

The ball-bearing provides a great assistance, however, and it is this small collection of well-hardened steel balls which gives the solution of the effective whirler of to-day. Give one part of the ball-bearing a fixed position, mount the other in a handle, which may be fitted by any mechanic, bent from iron ribbon, to catch your plate-holder in the right place, as shown in Fig. 4, and this principal part of the whirler is complete. It is simply made from light, rough wood, moving the two arms on an iron screw, with brass isolation to prevent all superfluous friction from wood on wood Such friction would only give occasion to breakages; with a little attention in the construction it is prevented. The position of the two moving arms is fixed instantly with the aid of a thin-shaped light-worked piece of aluminum fitted with a hand-screw.

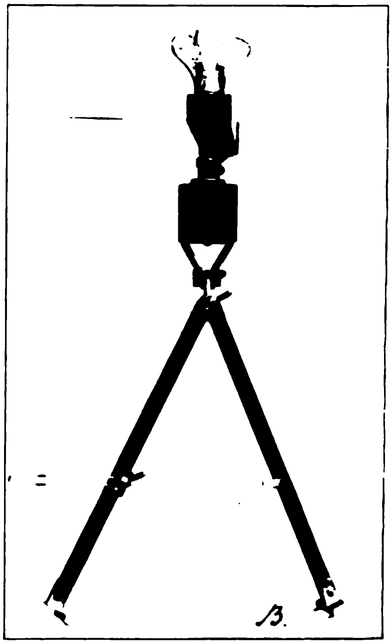


Fig. 6

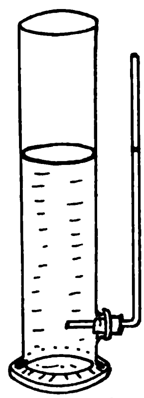
With one simple movement at the said screw your plate is fixed firmly, without possibility of flying in beautiful curves into the corners of the studio.

I believe the two small blocks and diagram show its construction plainly.

Speaking on printing matters, I might suggest a simple tool for preparing in short time a clean enamel solution without any filtering.

Prepare your solution in a bottle, no matter what shape it may be, and then pour the well-mixed solution, after all the slightest particles of the chromic salt have dissolved, into a high stand glass, wherein some 1-3 inch from the bottom a hole is fitted with a cork and glass tube, bent in a right angle, just as in sketch 7. Let the solution stand in the vessel just a day or overnight, then turn the clean glass tube and draw off the well-cleared solution into your pouring bottle. In this way all sediments, all streaks and points in your coating, are avoided.

Fig. 7.



Clearing Vessel for Enamel Solutions.

SOME DIFFICULTIES IN THE MAKING OF HALF-TONES

By Arthur Fruwirth

(*Translated by Henry Dietrich*)

WHO can claim to have fully mastered the problem of screen photography? Of course, those who do not understand the process thoroughly imagine that there is nothing required but to simply place a screen before the sensitive plate, exposing and developing afterward, as usual. Well do I remember many years ago the vexations of a photographer of the old school, a man who had been for thirty years in the photographic harness, who had trodden all the secret paths of reproduction photography, was familiar with all its tricks, and who could not be disturbed by the heat of summer or the cold and frosty atmosphere of winter. But on one occasion the old soldier was in utter despair because things wouldn't work properly, bath upon bath seemed to be bewitched, and all chemicals infested with bad spirits. And what was the matter? Only that a little condensed moisture had settled upon the screen. Is there a photographer who may not stumble or blunder any more, who can explain all the intricate appearances upon his daily field of labor, who can

eliminate the troubles and prove himself to be master of all obstructions and difficulties? I doubt it.

The small dots of a good half-tone negative look so sharp, clear, and correct; not a trace of fog is visible, no indistinct contours, no tattered edges disturb the symmetry of these small bodies, combining by united numbers into a picture hardly inferior to the original. And how do these small elements of half-tone photography originate?

It would be beyond the limit of our subject to describe the practical process and method of working in anything of a detailed order or submit it to a theoretical consideration. But I would like to call attention to some circumstances which have a tendency to render difficult, or to prevent entirely, the formation of these sharp dots, and of which photographic literature has made no mention yet, presumably because their nature appears to be still wrapped in darkness.

By construction and calculation I have succeeded in determining the form of the half-tone dots in all phases of exposure and to show why these dots, according to mode of working or illumination, are circular, rounded off, square, or star-shaped. The source of light which we must consider is the diaphragm. Emanating from it a bunch of rays falls upon the screen, passes through the square openings of the same, and thus lights the sensitive plate. It is plain that the theoretic form of an exposed dot upon the negative is equal to the projection of the diaphragm opening through the screen opening; therefore, in the case of a square diaphragm turned by 45° to the position of the square screen opening, an octagon of the form of Fig. 1 will result. A little thought will show us that the light is not uniformly distributed in this octagon, but decreases gradually from the bright center to zero along the edge. Consequently we will, according to the strength of light or the length of exposure, not obtain a picture of the whole octagon, but only a central fraction of the same of a certain shape. Fig. 2, which represents the light intensities by a curve, may serve to give an idea of what takes place.

Fig. 1

The data on which the calculation of this curve is based are the following:

Camera bellows—distance between plane of diaphragm and plane of sensitive plate..	1,100	mm.
Screen separation	4.5	"
Side of square-shaped diaphragm..........	34.5	"
Diameter of screen opening...............	0.1	"
(From this calculated) size of dot..........	0.28	"

If we imagine the total quantity of light to be divided into 16

units, part *a* of Fig. 3 would form first, then part *b*, then the dot grows to size *c*, then *d*, etc.; or if we look at the dot, so to say, from the bird's-eye perspective, first a small dot will form of the size and shape *a* (Fig. 4), which grows during the following time units to *b*, *c*, and *d*, etc. A complication and change of the original light curves takes place when two or four dots grow together with their edges, the form of the light curves changing completely. The result of a careful calculation is given in Fig. 5, in which the dots of an imaginary negative have been drawn upon paper by compass and rule, as they are produced, on the one hand, *by the light in the camera,* and on the other by the *manipulations of the photographer* upon the sensitive plate. I say expressly, "the light in the camera *and* the manipulations of the photographer" because the light alone (Fig. 2) can not produce a completely sharp dot, as it diminishes gradually and irregularly from the center to the edge. If we compare the light curves of Fig. 4 with the height curves of the ridge of a mountain, we will best comprehend the idea. It requires, therefore, the experienced hand of a photographer to obtain the dots sharp at the edge (by suitable development, intensification, and reduction), and herewith the step is taken from theory to practical execution.

Fig. 2

What are the most suitable means by which to obtain the dots sharp on the edges? Shall I describe how negatives are to be developed and finished? That would be received with very little interest. I intend to view the subject from another standpoint, one which has been avoided in photo literature: What *prevents* obtaining the dots sharp on the edge?

Operator A complains that he has not been able to obtain sharp dots. The shadows of his negatives are all right, but there is something the matter with the high lights. The high lights are either too open or entirely closed and foggy; the gradations from the connected to the open form are coarse, "fuzzy," notwithstanding reduction and intensification. He claims to have tried everything in order to discover the trouble. Bellows of camera were examined to locate cracks that might let light in and give cause for fog. He silvered the plates a long and a short time, gave long and short exposures, and subdued the light in the dark room to a minimum. He tried large and small diaphragms and screen separations. Always the same appearance of fuzzy dots, sometimes more, sometimes less. The dots remain rough and ragged; clearness was wanting. New collodion was of no avail. What is now to be done? Operator B advises another collodion, to which A objects, saying that his formula was recommended by high authority, and he had worked it himself

since last fall with the best success. But the dots do not become sharper, and as a last resort friend A tries a new formula, which to his surprise works well.

The following are the two collodions:

(1)	Iodide of ammonia........................	4	drams.
	Bromide of cadmium	2	"
(2)	Iodide of ammonia.........................	2	drams.
	Iodide of cadmium	2	"
	Bromide of cadmium......................	1	dram.
	Chloride of calcium......................	½	"

Each dissolved in 4 pints of ether alcohol.

Now, a good deal may be said about these collodions. In the first case the large quantity of bromide attracts our attention. Since Cutting, in 1852, took a patent on the introduction of brom-salts into the collodion, purely iodized collodion is no longer in use, except in special cases. But experience has taught us that the proportion of one part bromide to from three to five parts iodide should be the limit, for fear of weakening the brilliancy and perhaps causing the so-called bromide fog. In addition to the liberal use of bromide of cadmium, by which the negatives become thin and delicate but without brilliancy, the application of iodide of ammonia in such quantity causes us to reflect. The latter gives delicate pictures, but the collodion salted with it is very short-lived with or without the addition of brom-salts. The experience of photographer A confirms this.

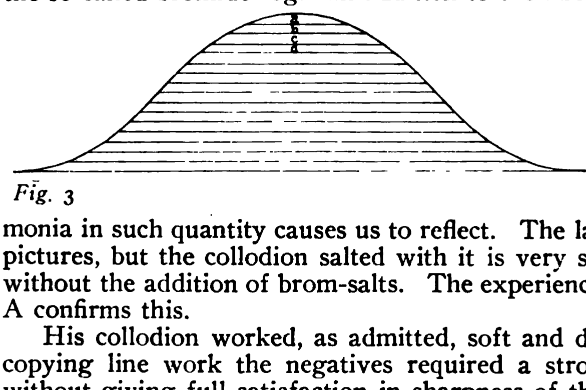


Fig. 3

His collodion worked, as admitted, soft and delicate. Used for copying line work the negatives required a strong intensification, without giving full satisfaction in sharpness of the lines. The collodion worked too flat for the purpose, but it was suitable for all cases where soft negatives were to be made from originals rich in contrast. Now, it is not surprising to us, after having analyzed the formula, that our friend A could work successfully for a long time with this collodion. He commenced to use it in the fall, and gave it up the following summer. In accordance with the proportion of its salts and their instability, the collodion will reveal its weakness mostly when the heat of summer in New York studios puts the quality of a collodion to its severest test.

Our friend now remembers another instance which at times was very troublesome: the sensitiveness of his collodion for small defects and uncleanliness of the glass plates. It is unavoidable that

Engraved by
Grand Rapids Eng. Co.,
Grand Rapids, Mich.

By D. D. Spellman

PORTRAIT STUDY

glass plates, by constant use, will wear out or sometimes become soiled by careless handling. In such cases it is indeed fortunate if the collodion, by means of its iodizing, does not draw a transparent border around each crack or scratch, no matter how fine, or surround each particle of dust with a dirt ring. A's collodion behaves on such plates very badly, so that long exposures will become a constant source of vexation and disgust.

We will comprehend the properties of collodion No. 2 much better if we look into the nature of a screen negative. Should negatives made with a screen be classified as line or half-tone negatives?*

This question can not be answered readily with yes or no. According to the final result, when every middle tone except clear glass or dead black is eliminated, they are line—but classed according to their origin they are by all means half-tone—negatives.

Yes, we have even a twofold gradation. Returning to Figs. 2 to 4 the very center of every dot must have an opacity which is greater or smaller according to the light quality of that spot in the original which the dot represents. In this respect there is the same relation, therefore, as if we worked without a screen. But besides this, each dot in itself represents a full gradation of tone from the maximal density (in the center) to the minimal density along the edge (see Figs. 2 and 3), as we have explained above. In the selection of the collodion we have to take these new conditions into consideration.

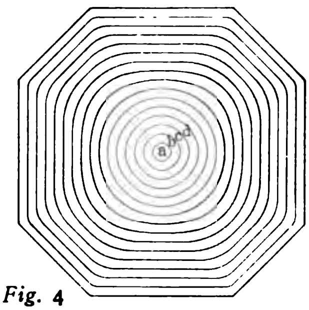


Fig. 4

For general reasons our negative collodion has therefore to work quick and soft, because it is to our interest to shorten the exposures to obtain as many details as possible from sometimes very dark originals. But, on the other hand, if we consider the nature, origin, and after-treatment by intensification and reduction of the dots, we desire a hard-working collodion, reproducing the half-tones badly, and which cuts along the above-mentioned light curves as sharp as possible.

The collodion which answers both conditions, to some extent at least, must therefore work clear, brilliant, and sensitive. Let us take into consideration, under this point of view, collodion No. 2. The proportion of bromide of cadmium is reduced to one-half, which increases the intensity and brilliancy of the negatives proportionately. Whether the chloride of sodium plays an important part or not is doubtful; chloride is inferior in sensitiveness to iodide—and even to bromide collodion—works thin and has very little stability.

* In this instance I use the expression half-tone negative not in the sense, as is customary for screen work, but in a general way for all negatives, which, besides the extremes of clear glass and opaque, contain a variety of tone gradations, as, for instance, ordinary portrait or landscape negatives.

The iodide ammonium of the first formula is likewise reduced and replaced to one-half by the more constant iodide of cadmium. Consequently there is at the same time a considerable increase of brilliancy without weakening the sensitiveness of the collodion.

The analyses of the two typical collodions demonstrate sufficiently their influence upon the formation and quality of half-tone dots.

* * * * * * *

I pass now to an appearance which is confined to screen work and has nothing to do with chemicals. I mean the so-called "sweating" of the screen. To make glass panes and other surfaces sweat two conditions are required—a difference of temperature and a certain moisture of the atmosphere. The fact that spectacles become moistened in winter time on entering a heated room from the cold atmosphere outside is well known, and also the reason for it. It is the same process with the screen. The wet plate which is placed near the screen reduces the temperature of the surrounding atmosphere somewhat by evaporation of the moist coating, and at the same time increases the quantity of moisture right around the screen. If the screen is now exposed to a higher temperature, the moisture will naturally settle in the form of a fine covering of microscopic water bubbles upon the screen. The increase of temperature takes place during exposure, and the consequences are destructive for the production of the dots. Spring and fall are generally the most favorable seasons for the production of moisture on the screen. The dark room cools off during the night, while the temperature in the studio during the day rises quickly under the influence of sunlight. Sweating very seldom takes place in diffused light with short exposures, draft originals, or in the shadows of the negative. It is, on the contrary, almost exclusively restricted to the high lights, and under certain circumstances follows sharply the outlines of the same, without passing into the dark parts. Such a negative hardly differs from an ordinary one after development, and he who has no practical knowledge of the process can easily be deceived. But when intensified it looks as if coated with soot, and in proportion to the amount of the sweating. Only a small spot may be affected, and, if my experience does not deceive me, such a spot may be looked for where the metal spring presses against the wet plate, or one or several larger places may be fogged. In the most unfavorable case all light parts of the negative are covered uniformly with a fog not visible by the naked eye, but which intensifies dead black. All such negatives are completely useless.

Why a moist screen fogs the negative hardly needs an explanation. Each drop of water of which the sweat consists acts like a lens and refracts the light toward all sides. That the fog is restricted to the high lights is not necessarily a consequence of uneven heating of the screen under the influence of exposure, although such an occurrence is within possibility. It may simply be accepted that

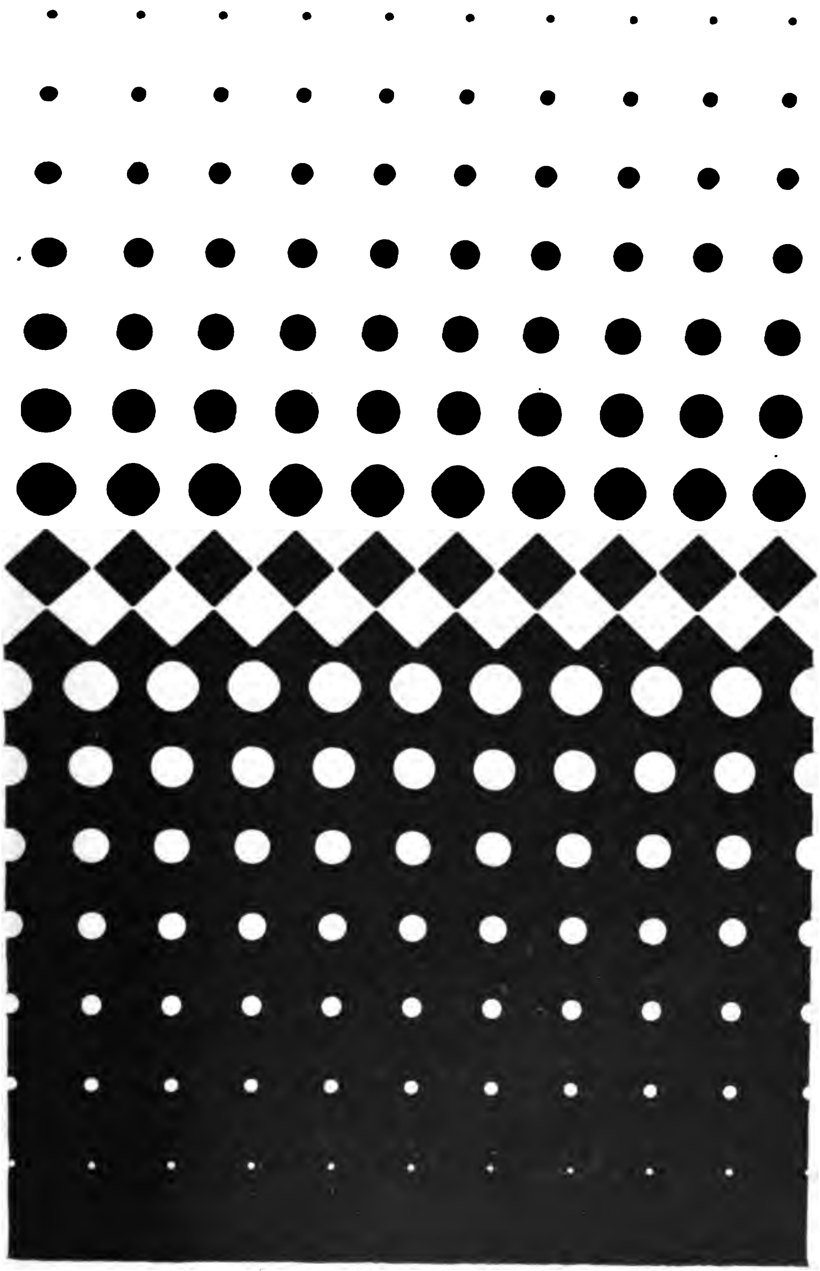


Fig. 5

in the dark parts of the original the light is not sufficiently strong to do any harm.

We now ask the question, How can we guard against this, the greatest and most bitter enemy of the photographer? There is no infallible medium to prevent sweating of the screen once and forever. But by proper attention it may be avoided in most cases. When the first signs of sweating are perceptible (and an experienced photographer should be familiar with the most dangerous days), the screen must be kept particularly clean. It is a fact that the sweat will form much less upon a well-polished clean screen than upon one which has already done service for several exposures. If the screen-plate is well cleaned with a silk rag and a little rouge before each exposure there is very little to be feared. A little heating over the gas oven will almost prevent sweating. But the latter manipulation is very dangerous in consequence of the low melting point of the screen-plate cementing. If the dark room is provided with hot air or steam heat, it will be a great remedy. The fact that screen sweating takes place principally in glaring sunlight, and with originals of very bright, chalky light, gives us a further hint. I have found that the appearance of fog is promoted by overexposure, which is a general rule in sunlight. The exposure should therefore be shortened as much as possible. Care should also be taken to subdue the sunlight. It has been proposed to prevent sweating by elimination of the moisture. For this purpose a shallow tray containing chloride of calcium should be placed in the interior part of the bellows. But a test will demonstrate the inefficiency of this proposition. I could not make out the slightest improvement.

Finally, I may mention a kind of fog which appears now and then, and which may not be traced directly to defective chemicals. While the fog caused by *sweating* is uniform and even, we have in this new case to do with comets, spots, and streaks, which confine themselves again only to the light parts and will never appear in the shadows. The latter fact, as also the circumstance that warming and great care in the cleanliness of the screen will obviate the evil, convince me that the causes are to be looked for in a contamination of the screen. That vapors are condensed on glass is a well-known fact. The screen gives us the best example. Have you ever thoroughly examined a screen after several exposures on wet plates, smaller than the screen? If so, you may have observed how the size of the wet plate left an impression upon the screen. And if now, without polishing the screen anew, a larger size is exposed, a negative will result upon which the preceding plate will be marked by dark streaks.

It is further a well-known fact that that part of the screen which is directed toward the sensitive plate is always more dirty (although not less protected against contamination), and requires a more thorough cleaning than the other. It may be noticed when simply breathing upon the plate, and fine streaks or clouds will

"MOUNT OF THE HOLY CROSS."

Engraved and Printed by
The Williamson-Haffner Engraving Co.,
Denver, Colo.

DEVELOPMENT POINTERS.

Great care is necessary in the manipulation of very sensitive plates to guard them against injury by traces of diffused light entering lens, camera, plate holder, or dark room, or the use of too strong a light while developing.

A ruby glass covered with orange-colored paper (known as Gold Bank Envelope) is recommended for the dark room light. Ruby color being the least actinic, offers the greatest protection. The safety of the light can be tested as follows: Cover one-half of a plate with opaque paper and hold it close to the light for about one minute. Develop, and if the unprotected part shows fog screen the light with additional paper until it is safe. It is advisable to have a second ruby glass arranged in a sliding frame to serve as a safeguard when working isochromatic plates. This frame should only be removed while examining the progress of development. The lens should be examined by pointing the camera toward strong light, and if there are reflections caused by the shining edges of the diaphragm or the inner walls of the tube they should be blackened.

To test the camera and plate-holder, protect a plate partially by a strip of black paper on its face, place in the camera, draw the slide and expose for five minutes while the lens remains covered. If camera and holder are not light-tight it will show on developing the plate. Fog is often caused by light entering the slide or between holder and back of camera.

A developer containing a surplus of alkali effects more detail in the shadows and lessens the intensity of the high lights, which causes more softness in the negative, consequently such a developer suits well for under-exposed plates, which explains why for under-exposures a preliminary bath in a soda solution or ammonia solution is used to advantage.

A large number of developing substances, such as pyro, eikonogen, metol, hydrochinone, and glycin, quickly intensify the high lights, and hasten the development, so that the shadows remain far behind; therefore a modification by little over-exposure, dull lighting, or soft-working plates, is of good service.

The developer diluted with water slows the process of development, gives the shadows more of a chance to work through before the high lights have gained their strength, prevents contrast, and therefore is recommended for contrasty plates or under-exposure.

The old or used developer acts the same as bromide, checks the development, and clears, and is used when plates are greatly over-exposed or a general fog is apparent.

A soft camel's hair brush may be used to remove the dust from

plates before placing them in the holder or dark slide. If the brushing is done hurriedly, the film will be instantly electrified and attract to itself more dust than you remove.

When plates are exposed and set away for future development, be sure to set them *face to face,* as they were in the original boxes. If the face or film is placed against the back, you will probably have finger-marks on the film, caused by the fingers coming in contact with the backs of the plates while placing them in the holder.

It is advisable to use a fresh solution of hyposulphite of soda each day during the hot weather. The fresh solution hardens the film, and alum will not be necessary.

Thorough fixing and thorough washing, followed by quick drying, will insure permanency and fine printing quality in the negative.

During the hot season the developer must be used more diluted and cold (by placing in ice-cold water), while *during the cold season* it should be stronger and moderately warm, about 70° F.

Developer, which is too strongly alkaline, or too warm, produces stain and fog.

As soon as *over-exposure* is noticed in developing, check it immediately by plentiful washing and finish with the regular developer, to which has been added bromide or old developer.

An *undertimed plate* should be treated with a fresh, diluted developer, and if sufficient detail does not appear, take the plate from the developer, and, without rinsing, place it in a tray containing water, to which a little of the alkaline solution (sulphite and carbonate of soda) has been added, and leave it there as long as it increases in detail. If it is not then strong enough, the development may be continued in fresh developer.

To prevent sand or rust from striking the negatives while washing, tie a piece of cotton flannel over the faucet.

Negatives exposed to white light before the bromide of silver is thoroughly dissolved in the fixing solution will be foggy, and the printing quality will be injured.

A solution of bromide of potassium (one ounce of bromide to ten ounces of water) should be in every developing room. When plates are a little over-exposed, a few drops of this solution added to the developer will restrain its action and may thus produce a good negative from what would otherwise be a worthless plate.

DEFECTS IN NEGATIVES AND CAUSES OF NON-SUCCESS.

Fog.—Overexposure, white light entering camera or dark room, too much light during development, unclean trays, developer decomposed, too warm or containing too much carbonate of soda or potassium. A slight fog can be removed by the red prussiate and hypo reducing solution.

Weak Negatives with Clear Shadows.—Underdevelopment.

Too Strong with Clear Shadows.—Underexposure, or too strong developer.

Weak Negative with Plenty of Detail in the Shadows.—Overexposure or too weak developer. Add some of the contrast developer to the normal.

Too Much Intensity.—Developer being excessively strong or too warm. Negatives dried in warm, sultry air assume more intensity than when dried in a cool place with draft.

Fine Transparent Lines.—Using too stiff a brush in dusting off plates.

Round Transparent Spots.—Air bubbles in the developer.

Transparent Spots of Irregular Shape.—Caused by dust. Keep the camera and holder free from dust and brush off the plate carefully before placing in the holder.

Yellow and Brown Stain or Iridescence of the Surface.—Caused by decomposed pyro solution, insufficient or decomposed sulphite of sodium in developer; using the developer warmer or stronger in alkali than the plate will stand, also by plain hypo solution, which by continued use has assumed a dark color, or by insufficient fixing. The stain may be removed by applying the red prussiate and hypo reducing solution and the iridescent surface can be wiped off with a tuft of cotton while the negative is wet.

Mottled Appearance of Negative.—Precipitation from the fixing-bath containing alum, if the solution is old or turbid.

Crystallization on the Negative and Fading of Image.—Imperfect elimination of the hypo.

Peculiar Streaks and Blotches, in the shape of brush marks, finger marks, and insensitive spots; appearing as though the plate had been scrubbed with a dirty or greasy brush or improperly cleaned, are caused by the uneven action of the developer.

This trouble is more liable to occur if hydrochinone is used in connection with eikonogen or metol, when the developer is too old or too much diluted, and can be prevented by a previous soaking of the plate in water, or by a radical change to a different developer.

ABOUT WEIGHTS, HYDROMETER TEST, AND SULPHITE AND CARBONATE OF SODA.

If the hydrometer be used, the most convenient way is to make up saturated solutions and to add water to a portion thereof, until the hydrometer indicates the desired degree. It makes no difference if dried sodas are used in place of crystals when the solutions are prepared by hydrometer test, but if they are prepared by weights it must be borne in mind that one ounce dried or anhydrous soda is equal to about two ounces crystals, owing to the water of crystallization the latter contain.

This applies to both the sulphite and the carbonate of sodium.

When dissolving dried sulphite or carbonate of sodium, the water should be vigorously stirred with a glass rod while adding

the powdered chemicals, to cause speedy solution and prevent the formation of a solid lump, hard to dissolve.

Carbonate of potassium may be substituted for dried carbonate of soda and is of equal strength.

The carbonates of soda or potassium are added to give the developing agent the alkalinity required for action, whereas the sulphite is added to prevent rapid decomposition and discoloration.

Sulphite of sodium and its solution decompose by contact with air, and therefore should be kept in well-stoppered bottles. The solution should be used while fresh. It is important that pure sulphite and carbonate of soda should be employed.

DRY PLATE DEVELOPERS.

PYROGALLOL.

CRAMER PLATES.

Pyro Solution.

Oxalic acid solution (1 to 10) .... 2 drams.
Pyrogallic acid .... 1 ounce.
Water ....15 ounces.

Alkaline Solution.

Sulphite of sodium..... 5 ounces dried, or 10 ounces crystals.
Carbonate of sodium.... 2½ ounces dried, or 5 ounces crystals.
Water ....60 ounces.

Or by Hydrometer, in equal parts:

Sulphite of soda solution ....Hydrometer 80°.
Carbonate of soda solution .... " 40°.

The sulphite of sodium and alkaline solutions must be kept in well-stoppered bottles, as they deteriorate by contact with air.

Mixed in the following proportions for immediate use:

FOR WINTER USE.

Pyro. solution ....1 ounce.
Alkaline solution ....2 ounces.
Water ....8 "

Always use twice as much alkaline as pyro solution.

FOR SUMMER USE.

Pyro solution ....½ ounce.
Alkaline solution .... 1 "
Water .... 9 ounces.

Always use twice as much alkaline as pyro solution.

All developers work best at a temperature of 60° to 70° F.

A more concentrated developer works fast and with much contrast. A diluted developer works slower but with finer detail, and is best for short exposures. A developer which is too concentrated

or too warm produces fog, unless it is restrained by the addition of a few drops of a 10 per cent. bromide of potassium solution.

CARBUTT'S.

No. 1.—*Pyro Stock Solution.*

Oxalic acid	15 grains,	or	1 gram.
Bromide of potassium	30 "	"	2 grams.
Distilled or ice-water	10 ounces,	"	300 c. c.

Then add Schering's pyro, 1 ounce, or 30 grams, and water to make 16 fluid ounces, or 480 c. c.

No. 2.—*Soda Stock Solution.*

Sodium sulphite, crystals..	4 ounces,	or	120 grams.
Soda carb., crystals (or dry gran. 1 ounce)	2 "	"	60 "
Potash carbonate	1 ounce.	"	30 "
Water	10 ounces,	"	300 c. c.

Dissolve and add water to make measure 16 fluid ounces, or 480 c. c.

No. 3.—*Bromide Solution.*

Bromide of sodium or potassium....	½ ounce,	or	14 grams.
Water	5 ounces,	"	150 c. c.

For Developer.

Dilute 2 ounces of Stock No. 2 with 7 ounces of water for cold weather, and 10 to 12 ounces of water in summer. To 3 ounces of dilute No. 2, add 1½ to 2½ drams, or 6 to 10 c. c., of No. 1. The more pyro, the denser the negative, and *vice versa.* No yellowing or fogging need be apprehended if the directions are followed. Development should be continued until the image seems almost buried, then wash and place in fixing bath.

Instantaneous Exposures.

For instantaneous exposures, take for a 5 x 8 or 6½ x 8½ plate 3 ounces of dilute No. 2. Lay the plate to soak in this, and cover pan. Put 2 drams of No. 1 into the graduate, and 3 drops of bromide solution. Pour the soda solution off of the plate into the pyro and back over the plate; let development proceed, and examine occasionally. Keep solution in gentle motion over the plate. A *very* short exposure may take ten minutes to fully develop. If the image is not fully brought out by this time, add to developer in pan three times its bulk of water, and let plate lie in it covered for half an hour or more if necessary, until full development is attained; then wash, and proceed with fixing.

PYRO AND POTASH DEVELOPER (BY HYDROMETER).

No. 1.

Sulphite of sodium testing 60°.

No. 2.

Carbonate of potassium testing 30°.

English Weights and Measures.	No. 3.	Metric Weights and Measures.
16 ounces	Pure water	480 c. cm.
15 grains	Oxalic acid	1 gram.
1 ounce	Pyro	30 grams.

To develop, take:

1 ounce	Solution No. 1	30 c. cm.
1 "	Solution No. 2	30 "
½ "	Solution No. 3	15 "
8 ounces	Water	240 "

When solutions are made up by hydrometer test, the temperature must be taken into consideration; for if the hydrometer is used to test the same solution at two different temperatures—say 45° F. and 90° F.—there will be a decided difference in the reading of the hydrometer scale. So, in using the hydrometer, try to have the tests take place at as near the same temperature as possible.

PYRO DEVELOPER, WITH CARBONATE OF SODIUM.

BY WEIGHT.

English Weights and Measures.	No. 1.	Metric Weights and Measures.
30 ounces	Pure water	900 c. cm.
5 "	Sulphite sodium crystals	150 grams.
2½ "	Carbonate sodium crystals	75 "

No. 2.

24 ounces	Pure water	720 c. cm.
15 grains	Oxalic acid	1 gram.
1 ounce	Pyrogallic acid	30 grams.

To develop, take:

1 ounce	Solution No. 1	30 c. cm.
½ "	Solution No. 2	15 "
3 to 6 ounces	Pure water	90 to 180 "

More water may be used in warm weather, and less in cool weather.

BY HYDROMETER TEST.

No. 1.

Sulphite of sodium testing 80°.

No. 2.

Carbonate of sodium testing 40°.

No. 3.

Pure water	24 ounces.
Oxalic acid	15 grains.
Pyro	1 ounce.

To develop, take:

No. 1	½ ounce.
No. 2	½ "
No. 3	½ "
Water	From 3 to 6 ounces.

Use more or less of No. 1, as may be required for your locality. In hot weather use a little less of No. 2.

See that the developing solutions are not too cold in cold weather, nor too warm in warm weather. This applies to all developers.

PYRO DEVELOPER, WITH CARBONATE POTASSIUM.

English Weights and Measures.	No. 1.	Metric Weights and Measures.
32 ounces	Pure water	960 c. cm.
8 "	Sulphite sod. crystals	240 grams.
1 ounce	Carbonate potas., dry	30 "
	No. 2.	
24 ounces	Pure water	720 c. cm.
15 grains	Oxalic acid	1 gram.
1 ounce	Pyrogallic acid	30 "
	To develop, take:	
1 ounce	Solution No. 1	30 c. cm.
½ "	Solution No. 2	15 "
3 to 6 ounces	Pure water	90 to 180 "

When the plate is fully developed, if the high lights are too thin, use less water in the developer; if too dense, use more water.

EASTMAN. (FOR FILMS.)

No. 1.

Pyrogallic acid	½ ounce.
Nitrous or sulphurous acid	20 minims.
Water	32 ounces.

No. 2.

Sulphite of soda, crystals	6 ounces.
Carbonate of soda, crystals	4 "
Water	32 "

To develop, take:

No. 1	1 ounce.
No. 2	1 "
Water	2 ounces.

EASTMAN. (FOR PLATES.)

No. 1.

Sulphite of soda, crystals	6 ounces.
Pyrogallic acid	1 ounce.
Water	32 ounces.

No. 2.

Carbonate of soda, crystals	4	ounces.
Water	32	"

To develop, take:

No. 1	1	ounce.
No. 2	1	"
Water	3 to 4	ounces.

In warm weather use more water, in cold less.

Seed.

No. 1.

Seed's C. P. sulphite of soda	1½	ounces.
Pyrogallic acid	1	ounce.
Sulphuric acid	5	drops.
Distilled or pure well water	16	ounces.

No. 2.

Seed's C. P. carbonate of soda	2	ounces.
Water	16	"

To develop, take:

No. 1	1	ounce.
No. 2	1	"
Water (in winter, 6 ounces)	8	ounces.

If negatives are too gray, take 1 ounce of sulphite of soda instead of 1½ ounces. If too yellow, take 2 ounces; that is, if the yellowness is not due to discolored fixing bath.

BY HYDROMETER TEST.

No. 1.

Make up solution of Seed's C. P. sulphite of soda to test 50°	18	ounces.
Pyrogallic acid	1	ounce.
Sulphuric acid	5	drops.

No. 2.

Seed's C. P. carbonate of soda solution to test........40°

To develop, take:

No. 1	1	ounce.
No. 2	1	"
Water (in winter, 6 ounces)	8	ounces.

If negatives are too blue or gray, make up the sulphite of soda solution to test 50°, 40°, or even less, as may be required.

The best printing color is a brownish black, but for this color do not carry development quite so far as you may have done when you obtained a bluish or grayish black. These latter colors should be avoided.

Engraved by
Electric City Engraving Co.,
Buffalo, N. Y.

FAST AGROUND

By W. J. Piatt

A B C PYRO DEVELOPER.

A.

Seed's C. P. sulphite of soda	¼	ounce.
Pyro	1	"
Citric acid	10	grains.
Water	8	ounces.

B.

Seed's C. P. sulphite of soda	1½	ounces.
Water	16	"

C.

Seed's C. P. carbonate of soda	2	ounces.
Water	16	"

To develop, take:

A	½	ounce.
B	1	"
C	1	"
Water (in winter, 6 ounces)	8	ounces.

For double-coated plates use 18 ounces of water.

BY HYDROMETER TEST.

A.

Citric acid	10	grains.
Pyro	1	ounce.
Seed's C. P. sulphite of soda	30	grains.
Water	6	ounces.

B.

Seed's C. P. sulphite of soda solution to test.................. 30°

C.

Seed's C. P. carbonate of soda solution to test................ 30°

To develop, take:

A	2 to 3	drams.
B	2	ounces.
C	2	"
Water (in winter, 4 ounces)	6	"

For double-coated plates use 18 ounces of water.

Less of " B " will give a warmer tone to negative. If negatives are too yellow use more of " B."

PYRO A B C DEVELOPER FOR USE WITH ORDINARY SODA (CRYSTALS).

BY WEIGHT.

A.

Water	10	ounces.
Sulphite of soda (crystals)	½	ounce.
Add enough pure acetic acid to this to turn blue litmus paper slightly red, then add pyro	1	"

B.

Sulphite of soda (crystals)	4	ounces.
Water	16	"

C.

Sal soda (crystals)	4	ounces.
Water	16	"

To develop, take:

A	½	ounce.
B	1	"
C	1	"
Water	8	ounces.

For double-coated plate use 18 ounces of water.

Apothecaries' weights are intended to be used in the above formulas.

More water gives softness, and less water, contrast. Use less water in cold weather.

BY HYDROMETER TEST.

A.

Water	10	ounces.
Sulphite of soda (crystals)	½	ounce.
Add enough pure acetic acid to this to turn blue litmus paper slightly red, then add pyro	1	"

B.

Sulphite soda solution to test .... 60°

C.

Sal soda solution to test .... 40°

To develop, take:

A	½	ounce.
B	1	"
C	1	"
Water	8	ounces.

Less of " B " will give a warmer tone to negatives. If negatives are too yellow use more of " B." If it is found during the summer months and in the South that acetic acid softens the film too much, substitute sulphuric acid.

NEW YORK.

No. 1.—*Pyro Stock Solution.*

Distilled or ice water	10 ounces,	or 300 c. c.
Sulphite of soda	4 "	" 120 grams.
Dissolve, then add:		
Pyrogallic acid	1 ounce	" 30 c. c.
Water to make up to	16 fluid ounces,	" 480 "

No. 2.—*Soda Stock Solution.*

Distilled or ice water	10 ounces,	or 300 c. c.
Sal soda........................	4 "	" 120 grams.
Dissolve, then add:		
Water to make up to	16 fluid ounces,	" 480 c. c.

No. 3.—*Bromide Solution.*

Bromide of potassium	½ ounce,	or 14 grams.
Water	5 ounces,	" 150 c. c.

To develop, take:

No. 1, Pyro stock solution................	1 ounce, or	30 c. c.
No. 2, Soda stock solution	1 " "	30 "
Water	6 ounces, "	180 "

BY HYDROMETER TEST.

No. 1.

Make stock solution of sulphite of soda to test 60° with hydrometer; allow to settle perfectly clear; then take:

Sulphite of soda solution	16 ounces.
Pyro	1 ounce.
Sulphuric acid	10 drops.
Or oxalic acid	10 grains.

No. 2.

Sal soda solution..............................Hydrometer 40°

To develop, take:

No. 1	1 ounce.
No. 2	1 "
Water	8 ounces.

J. Ed. Rösch's Formula for E. A. Extra Resublimed Pyro.

Prepare the alkaline solution with the hydrometer, mixing equal parts of the following solutions:

Carbonate of sodium solution..................	Hydrometer 30°
Sulphite of sodium solution....................	" 70°

Pyro Solution.

Dissolve 1 dram of sulphite of sodium crystals in 6 ounces of distilled or pure ice water, add acetic acid until the solution turns blue litmus paper red, and finally add 1 ounce of pyrogallic acid.

Mix in the following proportions:

Pyro solution	1 dram.
Alkaline solution	1 ounce.
Tepid water (for winter use)......................	2 ounces.
Or cold water (for summer use)................	3 to 5 "

E. H. Newell's Formula for E. A. Extra Resublimed Pyro.

No. 1.—*Soda Stock Solution.*

Carbonate of soda	Hydrometer 40°
Sulphite of soda	" 60°

Add together.

No. 2.—*Pyro Stock Solution.*

Pyro	1 ounce.
Oxalic acid	10 grains.
Water	6 ounces.

To develop, take:

Soda solution	1 ounce.
Pyro solution	1 dram.
Water	2 ounces.

J. S. Schneider's Formula for E. A. Extra Resublimed Pyro.

No. 1.

For Stock Solution take equal quantities of:

Sulphite of soda	Hydrometer 65°
Carbonate of soda	" 45°

No. 2.

Pyro	1 ounce.
Water	6 ounces.

Three or four drops of sulphuric acid, or just enough to turn blue litmus paper red.

To develop, take:

No. 1	1 ounce.
No. 2	1 dram.
Water	3 ounces.

PYRO AND METOL DEVELOPER.

Hammer's.

FINE FOR SHORT EXPOSURES.

No. 1.

57	ounces	Pure water	1710 c.cm.
2½	"	Sulphite sod. crystals	75 grams.
1	ounce	Metol	30 "

No. 2.

57	ounces	Pure water	1710 c. cm.
2½	"	Sulphite sod. crystals	75 grams.
¼	ounce	Pyrogallic acid	8 "

No. 3.

57 ounces......	Pure water	1710 c. cm.
2½ "	Carbonate potassium.............	75 grams.

To develop, take:

3 ounces......	Pure water	90 c. cm.
1 ounce.......	Solution No. 1	30 "
1 "	Solution No. 2	30 "
1 "	Solution No. 3	30 "

This developer may be used repeatedly by adding a little fresh developer as required.

Keep the used developer in separate bottle.

It combines the desirable qualities of Metol and Pyro, and gives an ideal negative.

HYDROCHINONE.

CARBUTT.

A.

Sulphite of soda, crystals	4 ounces,	or	120	grams.
Sulphuric acid	1 dram,	"	4	"
Hydrochinone	360 grains,	"	23½	"
Bromide of potassium	30 "	"	2	"
Warm distilled water	20 ounces,	"	600	c. c.
Water to make up to	32 "	"	960	"

B

Carbonate of potash	2 ounces,	or	60 grams.
Carbonate of soda, crystals	2 "	"	60 "
Water to make	32 "	"	960 c. c.

C.—*Accelerator.*

Caustic soda	1 ounce,	or	30 grams.
Water	10 ounces,	"	300 c. c.

For under-exposure, add a few drops of above to developer.

D.—*Restrainer.*

Bromide of potassium	½ ounce,	or	14 grams.
Water	5 ounces,	"	150 c. c.

To develop.

For Instantaneous Exposures, take: A, 1 ounce, or 30 c. c.; B, 1 ounce, or 30 c. c.; Water, 4 ounces, or 120 c. c.

For Portraits: A, 1 ounce, or 30 c. c.; B, 1 ounce, or 30 c. c.; Water, 5 ounces, or 150 c. c.

For Landscapes (Sen. 20-27): A, 1 ounce, or 30 c. c.; B, ½ ounce, or 15 c. c.; Water, 3 ounces, or 90 c. c.

For Landscapes, Full Exposure (Sen. 16–20): A, 1 ounce, or 30 c. c.; B, ¾ ounce, or 25 c. c.; Water, 4 ounces, or 120 c. c.

For Lantern Slides: A, 1 ounce, or 30 c. c.; B, ¾ ounce, or 25 c. c.; Water, 4 ounces, or 120 c. c.

For Lantern Slides and Full Exposures: A, 1 ounce, or 30 c. c.; B, ¾ ounce, or 25 c. c.; Water, 4 ounces, or 120 c. c.; and 2 to 6 drops Restrainer D to each ounce of developer.

Note.—More of A will increase density. More of B will increase detail and softness. Temperature of developer should not vary much below 65° nor above 75°. The after-treatment is much the same as with any other developer.

For Lantern Plates, Process Plates, and Large Transparencies.

No. 1.—*Hydrochinone Solution.*

Sulphite of soda, crystals	1	ounce.
Sulphurous acid	½	"
Water (distilled or boiled), warm	10	ounces

Mix with 2 ounces of cold water and add slowly to the sulphite solution, then add:

Hydrochinone	100	grains.
Bromide of potassium	30	"
Water to make the whole measure	15	ounces.

No. 2.—*Alkali Solution.*

Carbonate of soda, crystals	1	ounce.
Carbonate of potash	½	"
Water	3	ounces.
Water to make the whole measure	5	"

To form a developer, mix one part of No. 2 with three parts of No. 1.

Seed.

A.

Hydrochinone	1	ounce.
Sulphite of soda (crystals)	5	ounces.
Bromide of potassium	10	grains.
Water (ice or distilled)	55	ounces.

B.

Caustic potash	180	grains.
Water	10	ounces.

To develop, take:

Of A, 4 ounces; B, ½ ounce. After used, pour into a separate bottle. This can be used repeatedly and with uniformity of results by the addition of 1 dram of A and 10 drops of B to every 8 ounces of old developer.

In using this developer it is important to notice the temperature

of the room, as a slight variation in this respect causes a very marked difference in the time it takes to develop, much more so than with pyro. Temperature of the room should be from 70° to 75° F.

For flashlight exposures a normal developer is sufficient where sufficient powder has been used. A weaker developer is needed only when there is considerable distance between the subject and the light or where too little powder was used.

BROMO-HYDROCHINONE DEVELOPER.

For producing Great Contrast and Intensity, also for developing Over-Exposed Plates.

No. 1.

Sulphite of soda, crystals	3	ounces.
Hydrochinone	½	ounce.
Bromide of potassium	¼	"
Distilled or ice water	25	ounces.

No. 2.

Carbonate of soda, crystals	6	ounces.
Water	25	"

Mix equal parts of Nos. 1 and 2 for use.

This developer is excellent for copying pen drawings and engravings, and for all purposes where great density of the lights and clear glass in the shadows are required.

Byk's.

Hydrochinone	5	grams
Potassium carbonate	75	"
Sodium carbonate	40	"
Water to make	1000	"

Mix in reverse order. Use full strength.

Dr. Just's.

No. 1.

Hydrochinone	10	parts.
Sulphite of soda	60	"
Distilled water	240	"

No. 2.

Carbonate of potassium	120	parts.
Acetic acid	15	"
Distilled water	480	"

To develop, mix the solution in equal parts for use. The best results are obtained by commencing development with an old or once-used developer, and, when development is half completed, applying fresh.

MIETHE.

No. 1.

Sulphite of soda	35 grams.
Yellow prussiate of potash	30 "
Hydrochinone	7 "
Water	550 c. c.

No. 2.

Caustic potash	30 grams.
Water	550 c. c.

To develop, use three parts of No. 1, and two to three parts of No. 2, according to exposure and desired density.

EDWARDS'.

Carbonate of soda, granulated	100 grains.
Sulphite of soda, crystals	480 "
Hydrochinone	100 "
Water	14 ounces.

Use full strength.

DR. PIFFARD'S.

Sodium sulphite	480 grains.
Sodium carbonate	960 "
Hydrochinone	96 "
Water	16 ounces.

Mix and filter. This developer may be used repeatedly.

E. O. COCKAYNE'S FORMULA.

No. 1.—	Sulphite of soda	30 grams.
	Hydrochinone	5 "
	Water	250 c.c.
No. 2.—	Soda carbonate	60 grams.
	Water	250 c.c.

For use, mix equal parts of Nos. 1 and 2, adding bromide if required.

EIKONOGEN DEVELOPER.

CRAMER PLATES.

No. 1.

Eikonogen	1 ounce.
Sulphite of soda	1½ ounces dry, or 3 ounces crystals.
Water	60 ounces.

Engraved by
Hartel Engraving Co.,
New York

By F. L. Fales

BY HYDROMETER TEST.

Eikonogen	1 ounce.
Sulphite of soda solution, test 80°	10 ounces.
Water	50 "

No. 2.

Carbonate of potassium	1 ounce.
Water	40 ounces.

For use, three parts No. 1, one part No. 2.

This developer keeps well and works best after being used a few times. It may be left in the dish, immersing the plates therein, and occasionally adding fresh solution, which should be cool in summer and moderately warm in winter. Pour the developer back into the bottle when the day's work is done.

When starting with fresh solution add some of the old, or, if no old is on hand, add to 20 ounces fresh solution 10 minims (or drops) bromide of potassium solution (1 to 10).

Always develop the plate far enough to insure good printing density.

EASTMAN.

No. 1.

Sulphite of soda, crystals	3 ounces.
Eikonogen	1 ounce.
Water	60 ounces.

No. 2.

Carbonate of potash	3 ounces.
Water	30 "

To develop, take:

No. 1	2 ounces.
No. 2	1 ounce.
Water	2 ounces.

If you desire to have the developed negative of a warm tone, add 100 grams pyrogallic acid to No. 1 stock solution.

NEW YORK.

No. 1.

Distilled or ice water	60 ounces.
Eikonogen	1 ounce.
Sulphite of soda, crystals	3 ounces.
Sulphurous acid	½ ounce.

Dissolve the eikonogen in 30 ounces of the water, warmed. Dissolve the sulphite in 20 ounces, and dilute the acid in 10 ounces. Pour the sulphite solution into the eikonogen, then add the acid to the whole. Never pour the eikonogen into the sulphite solution.

No. 2.

Carbonate of soda, granular	4	ounces.
Water	40	"

To develop, take:

No. 1	4	ounces.
No. 2	4	"
Water	5	"

Add 10 drops of a 10 per cent. solution of bromide of ammonium. In hot weather increase the water to 10 ounces.

This developer can be used repeatedly by occasionally adding more of solutions No. 1 and No. 2.

To obtain thin negatives, full of detail, use the developer more diluted.

After development, wash thoroughly under tap, and immerse in fixing bath.

Dr. Vogel's Method.

No. 1.	Sulphite of soda	100	grams.
	Concentrated sulphuric acid	8	drops.
	Eikonogen	25	grams.
	Water	1,500	"
No. 2.	Soda carbonate, crystals	150	grams.
	Water	1,000	"

For use add three parts of No. 1 to one part of No. 2. Add bromide.

EIKONOGEN-HYDROCHINONE.

Carbutt's.

A.

Sulphite of soda, crystals	4	ounces,	or	120	grams.
Eikonogen	330	grains,	"	22	"
Hydrochinone	160	"	"	10½	"
Distilled water	20	ounces,	"	600	c. c.
Water to make up to	32	"	"	960	"

B.

Carbonate of potash	2	ounces,	or	60	grams.
Carbonate of soda, crystals	2	"	"	60	"
Distilled water	20	"	"	600	c. c.
Water to make up to	32	"	"	960	"

To develop, see Carbutt's Hydrochinone Developer.

Seed.

No. 1.

Seed's C. P. sulphite of soda	1½	ounces.
Eikonogen	240	grains.
Hydrochinone	60	"
Distilled or pure well water	32	ounces.

No. 2.

Seed's C. P. carbonate of soda	4	ounces.
Water	32	"

To develop, take:

No. 1	2	ounces.
No. 2	1	ounce.
Water	1	"

For double-coated plates use 5 ounces of water.

BY HYDROMETER TEST.

No. 1.

Seed's C. P. sulphite of soda to test 30°	34	ounces.
Eikonogen	240	grains.
Hydrochinone	60	"

No. 2.

Seed's C. P. carbonate of soda solution to test .... 50°

To develop, take:

No. 1	2	ounces.
No. 2	1	ounce.
Water	1	"

For double-coated plates use 5 ounces of water.
More water gives less contrast and density.

For use with ordinary Soda (crystals).

No. 1.

Sodium sulphite (crystals)	4	ounces.
Eikonogen	240	grains.
Hydrochinone	60	"
Distilled or pure well water	32	ounces.

No. 2.

Carbonate of potash	4	ounces.
Water	32	"

To develop, take:

No. 1	2	ounces.
No. 2	1	ounce.
Water	1	"

For double-coated plates use 5 ounces of water.

No. 1.

Sodium sulphite solution to test 30°	34 ounces.
Eikonogen	240 grains.
Hydrochinone	60 "

No. 2.

Carbonate of potash solution to test	50°

To develop, take:

No. 1	2 ounces.
No. 2	1 ounce.
Water	1 "

For double-coated plates use 5 ounces of water.

More water gives less contrast and density.

Another.

A good developer to give brilliancy from flat negatives, and also for somewhat warmer tones than our metol-hydrochinone formula gives, is as follows:

A.

Sulphite of soda (crystals)	1 ounce.
Citric acid	20 grains.
Eikonogen	120 "
Hydrochinone	60 "
Distilled water	20 ounces.

B.

Caustic potash (fresh and dry) or caustic soda	120 grains.
Bromide potash	120 "
Distilled water	20 ounces.

Use 2 of A to 1 of B. Can be used repeatedly.

Expose somewhat longer than for the metol-hydrochinone developer. Temperature of developer should be from 70° to 75° F.

Always develop to a good intensity, as plates developed with hydrochinone fix out somewhat. Rinse and fix.

Root's Developer.

No. 1.

Sodium sulphite, crystals	2½ ounces.
Eikonogen	1 ounce.
Hydrochinone	⅛ "
Water	64 ounces.

No. 2.

Potassium carbonate, dry	2½ ounces.
Water	64 "

To develop, take two parts of No. 1 and one part of No. 2, and old developer to give best results.

FERROUS OXALATE.

Neutral oxalate of potash, saturated solution. Protosulphate of iron, saturated solution. Sulphuric acid, 10 drops.

To develop.

Oxalate solution	10 ounces.
Iron solution	2 "
Old (used) developer	2 "

FOR TRANSPARENCIES AND OPALS.

CARBUTT'S.

A.

Oxalate of potash	8 ounces.
Citric acid	60 grains.
Citrate of ammonia solution	2 ounces.
Water	30 "

B.

Sulphate of iron	4 ounces.
Sulphuric acid	16 drops.
Water	32 ounces.

C.—*Citrate of Ammonia Solution.*

Dissolve 1 ounce of citric acid in 5 ounces of distilled water; add liquor ammonia until a slip of litmus paper just loses the red color; then add water to make the whole 8 ounces.

Developer.

Add 1 ounce of B to 2 ounces of A and ½ ounce of water, and 3 to 6 drops of 10 per cent. solution of bromide of potassium.

To develop, first rinse developing dish with water, lay film or plate down, and flow with sufficient developer to well cover. Careful attention must be given to its action, and, when detail is just showing in the face, or half-tone lights in a view, pour off the developer, and well wash the film before fixing.

METOL.

SEED.

No. 1.

Metol	100 grains.
Sulphite of soda (crystals)	1 ounce.
Water	8 ounces.

No. 2.

Potassium carbonate	1 ounce.
Water	10 ounces.

Take equal parts of No. 1 and No. 2 and six parts of water. If

more contrast is needed, take equal parts of No. 1 and No. 2 and three parts of water, with 5 drops to the ounce of a 1 to 10 solution of bromide of potassium.

Cramer.

For developing Underexposed Plates.

BY WEIGHT.

Metol	80 grains.
Sulphite soda	1½ ounces dry, or 3 ounces crystals.
Carbonate soda	½ ounce dry, or 1 ounce crystals.
Bromide of potassium	12 grains.
Water	80 ounces.

BY HYDROMETER TEST.

Metol	80 grains.
Sulphite soda solution, test 80°	10 ounces.
Carbonate soda solution, test 40°	6 "
Bromide of potassium	12 grains.
Water	64 ounces.

This developer can be mixed in advance ready for use, as it has good keeping qualities.

It should be placed in an extra dish when developing, so that plates showing underexposure in the normal developer may be transferred to the metol, to bring out the detail in the shadows as much as possible.

METOL AND HYDROCHINONE.

Hammer.

No. 1.

Metol	1 ounce,	or	30 grams.
Hydrochinone	⅛ "	"	4 "
Sulphite of soda, crystals	6 ounces,	"	180 "
Pure hot water	80 "	"	2400 c. c.

No. 2.

Carbonate of soda, crystals	5 ounces,	or	150 grams.
Pure water	80 "	"	2400 c. c.

To develop, take:

Solution No. 1	1 ounce,	or	30 c. c.
Solution No. 2	1 "	"	30 "
Pure water	2 ounces,	"	60 "

Formula for a Small Quantity of the above Developer.

No. 1.

Sulphite of soda, crystals	150 grains,	or	10 grams.
Eikonogen	60 "	"	4 "
Hydrochinone	8 "	"	½ gram.
Pure water	8 ounces,	"	240 c. c.

No. 2.

Carbonate of potash, dry............	150 grains, or	10 grams.
Pure water	8 ounces, "	240 c. c.

To develop, take:

Solution No. 1	2 ounces, or 60 c. c.
Solution No. 2	1 ounce, " 30 "

Can be used repeatedly until exhausted.

New York.

Sulphite of soda solution, hydrometer 25°.............	12 ounces.
Carbonate of soda solution, hydrometer 15°............	12 "
Metol	50 grains.
Hydrochinone	60 "

To develop, take 1 ounce of solution to 2 ounces of water.

For instantaneous or undertimed exposures, use equal quantities of the solution and water.

Seed.

No. 1.

Metol	30 grains.
Hydrochinone	30 "
Sodium sulphite (crystals)	240 "
Water	16 ounces.

No. 2.

Potassium carbonate	120 grains.
Water	10 ounces.

To develop, take:

No. 1	1 ounce.
No. 2	1 "
Water	2 ounces.

By hydrometer test.

No. 1.

Sodium sulphite solution to test 15°............	16 ounces.
Metol	30 grains.
Hydrochinone	30 "

No. 2.

Potassium carbonate solution to test ....15°.

To develop, take:

No. 1	1 ounce.
No. 2	1 "
Water	2 ounces.

For Black-Tone Transparency and Lantern Plates.

A.

Metol	30	grains.
Hydrochinone	30	"
Sodium sulphite (dry)	120	"
Water	16	ounces.

B.

Potassium bromide	15	grains.
Sodium carbonate (dry)	120	"
Water	16	ounces.

If the crystallized sulphite and carbonate are used, take twice as much of each as the formula calls for. To develop, take equal parts of A and B. Developer should not be lower than 75° F. in winter and not higher than 70° F. in summer, and can be used repeatedly, but should be discarded as soon as discolored, as it will then stain the film. Always develop to a good intensity, as plates developed with hydrochinone fix out somewhat. Rinse and fix.

AMIDOL.

Sodium sulphite, crystals	120	grains.
Amidol	20	"
Water	10	ounces.

This developer should always be used fresh.

Or:

Sodium sulphite, crystals	800 grains,	or	52 grams.
Amidol	80 "	"	5 "
Water	8 ounces,	"	240 c. c.

To develop, take four parts of water and one part of amidol solution.

Dr. O. Lohse's Formula.

Sulphite of soda	1½ ounces,	or	50 grams.
Potassium bromide	30 grains,	"	2 "
Citric acid (to soften the film)	15 "	"	1 "
Water	32 ounces,	"	1 litre.

To every ounce of above, add 2½ grains of amidol. If it then works too fast, dilute with water. No alkali being required, danger from frilling is minimized.

RODINAL.

Hammer.

Rodinal	1	part.
Pure water	30	parts.

Use repeatedly, adding fresh as required.

Engraved by
Scientific Engraving Co.,
New York

By J. Will. Kellmer

GLYCIN.

CRAMER.

For developing Overexposed Plates.

Also useful as an addition to normal developer in case same does not work with sufficient clearness and contrast, and for developing copies of pencil sketches, pen drawings, etc.

BY WEIGHT.

Carbonate of soda	4 ounces dry, or 8 ounces crystals.
Sulphite of soda.............	2 ounces dry, or 4 ounces crystals.
Glycin	1 ounce.
Bromide of potassium	1/4 "
Water	80 ounces.

BY HYDROMETER TEST.

Carbonate of soda solution, test 40°	48 ounces.
Sulphite of soda solution, test 80°	12 "
Glycin	1 ounce.
Bromide of potassium	1/4 "
Water	20 ounces.

This solution keeps well, and can be used over and over again. As soon as a plate shows overexposure in the normal developer, place it in the dish containing the contrast developer.

Concentrated Developer.

Sulphite of soda..................................	25 grams.
Dissolved in:	
Water	40 c. c.
To which are added:	
Glycin	10 grams.
Potassium carbonate	50 "

For use dilute 15 or 20 times.

More sulphite will improve keeping quality, but is unnecessary and only retards development.

Development.—(Jules Fuerst.)

A.—Sulphite soda, crystals......	125 grams........	625 grains.
Potassium carbonate........	50 "	250 "
Glycin	50 "	250 "
Hot water	1000 c. c..........	10 ounces.
B.—Potassium carbonate	125 grams........	625 grains.
Water	1000 c. c..........	10 ounces.
C.—Sulphite soda, crystals........................		125 grams.
Potassium carbonate		250 "
Glycin		50 "
Hot water..................................		1000 c. c.

C is a concentrated one-solution developer.

For normal exposure, take 1 part A, 2 parts B, and 1 part water, or 1 part C diluted with 3 times its bulk of water, or 1 to 6 for under-exposure. For over-exposure, 3 parts A, 2 parts B, and 3 parts water. This increases the amount of glycin, and decreases that of the alkali, although generally the addition of bromide and dilution of the developer with water are all that is necessary.

For under-exposure, developer should be freely diluted to give time for developer to act on slightest light impressions without "plugging" high lights.

For unknown exposures, take 1 part B, 2 parts A, and 2 parts water, to which add 15 drops bromide solution, 10 per cent. If the details appear in less than thirty seconds, the plate is over-exposed. Any tendency to harshness must be remedied by addition of more potash and further dilution.

Stand Development.

Glycin	2 parts, or	10 grains.
Sulphite soda, crystals	2 " "	10 "
Potassium carbonate	10 " "	50 "
Hot water	100 " "	1 ounce.

When all has been dissolved, add:

Water	900 parts, or	9 ounces.

A normally exposed plate will take about a half-hour to develop, where an under-exposed one will take from one to three hours.

No clearing bath is necessary with Glycin.

GLYCIN.

Glycin	5 parts.
Sodium sulphite	15 "
Potassium carbonate	25 "
Water	90 "

For use, dilute with 3 or 4 volumes of water.

TOLIDOL.

The following formulas give the proportions of chemicals required for one ounce and for sixteen ounces of water used.

One Ounce.

Tolidol	1½ grains.	
Sulphite of soda, C. P., dry	4½ "	(9 gr. crys.)
Carbonate of soda, C. P., dry	6 "	(15 gr. crys.)
Water	1 ounce.	

Sixteen Ounces.

Tolidol	24 grains.	
Sulphite of soda, C. P., dry	72 "	(or 144 gr. crys.)
Carbonate of soda, C. P., dry	96 "	(or 240 gr. crys.)
Water	16 ounces.	

For Tank Development.

Dr. John M. Nicol recommends the Standard Formula diluted with eight times the amount of water, and the addition of one drop of retarder to every ounce after the dilution.

To obtain very Strong Negatives and in order to develop in the shortest possible time, the following formula may be used:

One Ounce.

Tolidol	3 to 4 grains.	
Sulphite of soda, dry	5 "	(10 gr. crys.)
Carbonate of soda, dry	7½ "	(18 gr. crys.)
Water	1 ounce.	

Sixteen Ounces.

Tolidol	50 to 65 grains.	
Sulphite of soda, dry	80 "	(or 160 gr. crys.)
Carbonate of soda, dry	120 "	(or 300 gr. crys.)
Water	16 ounces.	

On the same brand of plates a little additional retarder will be necessary.

ORTO-METOL.

HENRY WENZEL, JR.

A.

Metol	120 grains.
Metabisulphite of potassium	60 "
Ortol	180 "
Bromide of potassium	50 to 100 "
Hypo	10 "
Water	47 ounces.

B.

Sodium sulphite, crystals	4½ ounces.
Carbonate of potassium	1½ "
Water	47 "

Or by hydrometer:

Sodium sulphite solution, test 40°	27 ounces.
Sodium carbonate solution, test 30°	20 "

For use, take:

A	7 ounces.
B	8 "

To make up the above in one solution, take:

Metol	12 grains.
Metabisulphite of potassium	6 "
Ortol	18 "
Sulphite of sodium crystals	½ ounce.
Carbonate of potassium	80 grains.
Bromide of potassium	5 to 10 "
Hypo	1 grain.
Water	10 ounces.

ORTOL.

Dr. Eder's Formula.

No. 1.

Metabisulphite of potassium	7.5 grams, or	1 dram 55 grains.
Ortol	15 " "	4 drams.
Water, cold	1000 c. c. "	34 fluid ounces.

No. 2.

Crystallized sulphite of soda	180 grams, or	5 oz. 6 dr. 8 gr.
Crystallized carbonate of soda	120 " "	3 oz. 6 dr. 52 gr.
Bromide of potassium	1 to 2 " "	15 to 30 grains.
Water	1000 c. c. "	34 fluid ounces.

In winter time the bromide may be omitted. For gallery work, mix equal parts of No. 1 and No. 2. For landscapes, mix 1 ounce each of No. 1 and No. 2, and dilute with 1 ounce of water.

FIXING BATHS FOR PLATES.

Sodium hyposulphite	2 ounces.
Water	10 "

Or:

Sodium hyposulphite	2 ounces.
Acid sulphite of soda	½ ounce.
Water	10 ounces.

This bath is somewhat reducing in its action, and will be found useful in clearing muddy or stained negatives.

Another.

Hyposulphite of soda	2½ pounds.
Alum	2 ounces.
Water	4 quarts.

Eastman.

Hyposulphite of soda	4 ounces.
Water	16 "

Leave the plate in the bath a few minutes longer than is required for fixing. This is important, as the permanency of the negative depends upon it.

In hot weather, the best prevention from softening of the film is to make a fresh hypo bath each day just before it is needed. Laying the plate for a few minutes in a clear, saturated solution of alum just before fixing will also act beneficially.

HEMPERLEY'S.

Take thirty-two ounces of sulphite of soda, hydrometer 60°, add to this one ounce of sulphuric acid very slowly, and eight ounces of solution of chrome alum, hydrometer 60°, then add the whole to two gallons of saturated solution of hyposulphite of soda, and it is ready for use.

Leave the negatives a few minutes longer in the bath than is required for fixing. This is important, as the permanency of the negative depends upon it. Do not use a flat tray to fix in; it causes spots and dirt. Use a grooved box.

LABORIE'S.

Bisulphite of soda	100 grams.
Hyposulphite of soda	150 "
Water	1000 c. c.

CARBUTT'S.

Sulphuric acid	1 dram,	or	4 c. c.
Hyposulphite of soda	16 ounces,	"	480 grams.
Sulphite of soda	2 "	"	60 "
Chrome alum	1 ounce,	"	30 "
Warm water	64 ounces,	"	1920 c. c.

Dissolve the hyposulphite of soda in 48 ounces, or 1440 c. c., of water; the sulphite of soda in 6 ounces, or 180 c. c., of water; mix the sulphuric acid with 2 ounces, or 66 c. c., of water, and pour slowly into the sulphite of soda solution, and add to the hyposulphite; then dissolve the chrome alum in 8 ounces, or 240 c. c., of water, and add to the bulk of solution, and the bath is ready. This fixing bath will not discolor until after long use, and both clears up the shadows of the negative and hardens the film at the same time.

After negative is cleared of all appearance of silver bromide, wash in running water for not less than half an hour to free from any trace of hypo solution. Swab the surface with wad of wet cotton, rinse, and place in rack to dry spontaneously.

Cramer.

BY WEIGHT.

No. 1.

Hyposulphite of soda	32 ounces.
Water	96 "

No. 2.

Sulphite of soda	2 ounces dry, or 4 ounces crystals.
Sulphuric acid	½ ounce.
Powdered chrome alum	2 ounces.
Water	32 "

BY HYDROMETER TEST.

No. 1.

Hyposulphite of soda solution, test 80°	110 ounces.

No. 2.

Sulphite of soda solution, test 80°	12 ounces.
Sulphuric acid, C. P.	½ ounce.
Chrome alum	2 ounces.
Water	20 "

The chrome alum is previously dissolved in the water.

Pour No. 2 into No. 1 while stirring well.

During the cold season, one-half the quantity of No. 2 is sufficient.

This bath remains clear after frequent use, does not discolor the negatives, and hardens them to such a degree that they can be washed in warm water. They should be left in the bath five to ten minutes after the bromide of silver appears to have been dissolved, to insure permanency, freedom from stain, and perfect hardening. If the bath becomes exhausted by continued use replace it by a new one.

Seed.

No. 1.

Sodium hyposulphite	2 pounds.
Sodium sulphite, crystals	4 ounces.
Water	96 "

No. 2.

Chrome alum	2 ounces.
Sulphuric acid	¼ ounce.
Water	32 ounces.

Pour No. 2 into No. 1 while stirring rapidly.

Seed.

Summer Fixing Bath.

In hot weather a plain, fresh hypo bath, with the addition of formalin, will keep the film firm. Use this formula:

Hypo	15	ounces.
Formaldehyde	½	ounce.
Water	½	gallon.

Seed.

Fixing Bath for Transparency Plates.

A

Hyposulphite of soda	1	pound.
Sulphite of soda, crystals	2	ounces.
Water	64	"

B

Chrome alum	1½	ounces.
Sulphuric acid, conc.	1	dram.
Water	16	ounces.

While stirring A vigorously, pour in B. This bath will keep, but it should be filtered occasionally.

Hammer.

Acid Chrome Alum Fixing Bath.

This may be used in hot weather, and is to be mixed in the order given; then it will always work clear.

Sulphuric acid	3	drams.
Sulphite of soda	4	ounces.
Water (about)	100	"

When this is about half dissolved, add 2 pounds of hyposulphite of soda; after the hypo is dissolved, add from 1 to 2 ounces of chrome alum dissolved in 20 ounces of water; then add enough water to make 160 ounces.

Another formula for preparing a highly concentrated "acid chrome alum sulphite solution" that can be made up in any quantity, and added to the fixing solution—one ounce to each gallon of solution as needed—to harden the film in hot weather. Make a solution of sulphite of soda in water testing 60° by hydrometer; to each 32 ounces of this add 1 pound of chrome alum; when this is dissolved, add *slowly* 2 ounces of sulphuric acid.

Acid Fixing Bath.

This is better than a plain bath, and is to be mixed in the order given. Always works well and remains clear.

Sulphuric acid	3	drams.
Sulphite of soda	4	ounces.
Water (about)	120	"

Stir well until at least half of the sulphite is dissolved, and then add hyposulphite of soda, 2 pounds, and water to make 160 ounces.

INTENSIFICATION.

After fixing and washing thoroughly, immerse in a tray containing the following: 1 ounce each of bichloride of mercury and potassium bromide, dissolved in 32 ounces of water. Keep in motion until the film is evenly whitened, then rinse and apply a solution of sulphite of soda, 1 ounce, to water 10 ounces.

For very slight intensity, use above solutions diluted to suit the case.

Agfa Intensifier.

Dilute 1 part of agfa with 10 parts of water and immerse the negative, to be intensified, in the dilute solution left in this bath until the necessary intensification is arrived at, which can be judged with facility.

The maximum intensification is complete in the first 10 minutes. If the plate be left in the solution for a longer period, the image assumes a whitish gray tone and is rendered more opaque.

The intensification commences immediately, at the expiration of two minutes is well advanced, and in many cases is quite sufficient.

The intensified negative is then well washed and dried.

Cramer.

Prepare a saturated solution of bichloride of mercury and add to each ounce 1 drop of muriatic acid. Dilute 1 part of this solution with 20 parts of water, and after washing the negative well, immerse it therein until the film is evenly whitened, then rinse and apply a solution of sulphite of soda about 1 ounce to 20 water. This will cause the negative to assume a dark brownish color. The process can be repeated if more intensity is required. Finally wash.

The Agfa or the Pfabe intensifier, both for sale by dealers in photo supplies, may be used for the same purpose.

Seed.

The fixed and well-washed negative is allowed to remain in the following mercuric-chloride bath until the film is thoroughly whitened:

Mercuric chloride	1 part.
Potassium bromide	1 "
Water	50 parts.

The bleaching being completed, the mercuric solution is rinsed off and the negative is immersed in a mixture of equal parts of saturated solution of sodium sulphite and water. The darkening action will be seen to take place steadily and slowly, just as when ammonia is used. Wash away the excess of sulphite.

Engraved by
Gill Engraving Co.,
New York

By Geo. E. Tingley

EDGE OF THE POND.

Hammer.

No. 1.

Bichloride of mercury	60	grains.
Bromide of potassium	60	"
Water	6½	ounces.

No. 2.

Sulphite of soda	½	ounce.
Water	4	ounces.

Place the negative in solution No. 1 until bleached; then rinse and place in solution No. 2 until entirely cleared; after which the plate must be well washed. This operation may be repeated if there is not sufficient intensity gained by first treatment.

Carbutt.

With correct exposure and development, intensification need never be resorted to. The following formula is, however, very effective, and the most permanent of all methods:

No. 1.

Bichloride of mercury	240 grains,	or	16 grams
Chloride of ammonia	240 "	"	16 "
Distilled water	20 ounces,	"	600 c. c.

No. 2.

Chloride of ammonia	240 grains,	or	16 grams.
Water	20 ounces,	"	600 c. c.

Let the plate to be intensified wash for at least half an hour, then lay in a 5 per cent. solution of alum for ten minutes, and again wash thoroughly; this is to insure the perfect elimination of the hypo. The least trace of yellowness after intensifying shows that the washing was not sufficient; then immerse negative in above No. 1 solution, observing that the longer it remains in the solution the greater will be the final density. Wash well, and flow over for a few seconds the solution of ammonium chloride No. 2. Wash after this application, and immerse in dilute ammonia water (1 dram of strong ammonia in 8 ounces of water) until the white image is darkened through to back of plate; or in place of the dilute ammonia, a 10 per cent. solution of sulphite of soda. When darkened through, rinse well and set up to dry.

Scolik's Method.

The fixed and well-washed negative is allowed to remain in the following mercuric chloride bath until the film is thoroughly whitened:

Mercury bichloride	1	part.
Potassium bromide	1	"
Water	50	parts.

The bleaching being complete, the mercuric solution is rinsed off, and the negative is immersed in a mixture of equal parts of a saturated solution of sodium sulphite and water. Finally, wash well.

Liesegang's Method.

No. 1.

Sulphate of copper	75 grains.
Potassium bromide	75 "
Water	6½ ounces.

No. 2.

Nitrate of silver	90 grains.
Water	4 ounces.

Place negative for ten minutes in No. 1, wash it for five minutes, and immerse it in No. 2 until blackened.

REDUCTION.

Dissolve 1 part of red prussiate of potash in 15 parts of water. Wrap the bottle in yellow wrapping-paper, as the solution is affected by light and will not keep long. Immerse the negative in a hypo solution—1 part hypo to 15 parts of water—to which has been added a little of the above immediately before use. When reduced sufficiently, wash thoroughly.

Seed's Reducer.

No. 1.

Red prussiate of potash	15 grains.
Water	1 ounce.

No. 2.

Hypo-soda	240 grains.
Water	16 ounces.

Take No. 1, 4 drams, and add to No. 2.

When the negative is thoroughly fixed and washed, lay into the above solution until sufficiently reduced. Wash after immersion.

Cramer.

For reducing the intensity of negatives which have been fully exposed or overexposed:

No. 1.

Red prussiate of potassium	1 ounce.
Water	16 ounces.

As this solution is affected by light, the bottle containing it should be of amber color or wrapped in opaque paper and kept in the dark when not in use.

No. 2.

Hyposulphite of soda .... 1 ounce.
Water ....16 ounces.

Mix 8 ounces No. 2 and 1 ounce No. 1, and use in subdued daylight.

The negative can be placed in this solution directly after fixing. If a dry negative is to be reduced, wet it thoroughly before applying the solution. To avoid streaks, always rinse the negative before holding it up for examination. As soon as sufficiently reduced wash thoroughly.

Negatives which are slightly foggy can be cleared with this solution, as the red prussiate cuts slightly into the shadows.

To reduce the intensity of an underexposed negative, where it is important to keep all the detail in the shadows, use the following:
Persulphate of ammonium, 3 parts (or 15 grains per ounce of water).
Water ....100 parts.

Before applying this solution (which should be freshly prepared), the negative must be well washed to remove all traces of hypo. Dry negatives should first be soaked in water for at least half an hour.

Keep the dish in motion, and when the intensity is sufficiently reduced rinse immediately and immerse the negative in a solution of 1 part dry sulphite of soda (or 2 parts crystals) in 20 parts water, hydrometer test about 25°, to stop the action of the reducer, and then wash well.

The final washing should be a thorough one, as the chemicals, especially the hypo, are difficult to eliminate from a gelatine film. Let the plates remain at least an hour in running water. If no hydrant is on hand, wash an hour, changing the water frequently.

CLIMAX REDUCER.

To reduce a negative, it is immersed in a solution made by mixing equal parts of the following:

No. 1.

Red prussiate of potash .... 1 ounce.
Water ....20 ounces.

No. 2.

Hyposulphite of soda .... 1 ounce.
Water ....20 ounces.

Several negatives may be reduced with the same solution. If very little reduction is needed, reduce the solution by adding water. Not necessary to wash before reducing.

Cyanide Reducing Solution.

Cyanide of potassium	20 grains.
Iodide of potassium	10 "
Bichloride of mercury	10 "
Water	10 ounces.

Reduction takes place slowly and is easy to control. After reducing, the negative should be washed thoroughly.

ANOTHER METHOD.

No. 1.

Hyposulphite of soda, crystals	772 grains.
Water	8 ounces.

No. 2.

Ferricyanide of potassium	76 grains.
Water	6 drams.

To reduce, use No. 1, 5 ounces; No. 2, 2 drams.

ANOTHER METHOD.

Potassium ferricyanide	1 ounce or 30 grams.
Distilled or melted ice water	16 fluid ounces or 500 c. c.

Keep the above solution in the dark when not in use. To reduce a negative, immerse it in hypo solution of a strength of about one ounce of hypo to a pint of water, to which a small quantity of the reducing solution has been added. To reduce locally, immerse the plate for a few minutes in water and apply the mixed solution with a camel's hair brush to the part required. Silver stains may also be removed after wetting the plate by brushing them over with the solution. At the end, wash thoroughly. The ferricyanide solution must be added to the hypo at the time of using, as the mixed solutions do not keep.

BARTLETT'S REDUCER.

Perchloride of iron	30 grains.
Citric acid	60 "
Water	1 pint.

PRINTING PROCESSES.

MONARCH MATTE—PURE COLLODION PAPER

Printing.

The greatest cause of failure with Monarch Matte will be in printing too deep. Being rich in silver it requires printing only to the point where the highest lights are slightly tinted; in other words, continue while the print is gaining in strength and brilliancy and stop when print begins to lose. If you overprint the high lights they will not clear up and you will get muddy half-tones.

Washing.

Wash in five or six changes of water, handling prints over each time. In cold weather a temperature of 75° F. is preferred. An even temperature in washing and toning baths gives best results, as at 75° you get best chemical action. Wash until no trace of free silver shows in wash waters. A little extra time spent in thorough washing will save time in toning and insure more brilliant results.

Toning Bath.

Monarch matte may be toned in any pet gold bath or the following: 1 grain E. A. chloride of gold to 60 ounces water, and make slightly alkaline with bicarbonate of soda for purple black or borax for brown or olive black, or sal soda for warm black.

We recommend, however, the following:

Monarch gold	1	dram.
Salt	½	teaspoonful.
Borax enough to make slightly alkaline.		
Water	60	ounces.

The keynote in the gold bath is: Tone your high lights and middle tints clear. The speed of gold baths should be from 6 to 10 minutes; a faster one giving surface tones.

Intermediate Wash.

After prints are toned in gold bath, wash through two changes of water, handling prints each time, then tone in the platinum bath.

Platinum Bath.

Monarch platinum	1 dram.
Water	20 ounces.

For black tones, tone until the red has disappeared by transmitted light, and for olive tones until the olive appears, and don't forget the temperature, 75°.

To those desiring to dissolve their own chloro-platinite we recommend the E. A. platinite, formula for use of which will be furnished on application.

For Green Tones.

Monarch platinum	1 dram.
Water	40 ounces.

Tone in gold bath same as usual, and then tone in this weak bath. The prints should be at least one-half hour in toning, and beautiful green tones may be obtained in this manner. Then wash through two changes of water, and fix in hypo bath of 15° hydrometer test, or,

Hypo Bath.

Hypo	1 ounce.
Water	30 ounces.

Fix 10 to 15 minutes. If prints begin to bleach *after* 10 *to* 12 *minutes* they are fixed, as they will not bleach until fixation is complete.

Intermediate Washing.

Thorough washing between the gold and platinum bath and platinum and hypo are necessary, as alkali carried into the platinum from the gold bath precipitates the platinum and gives muddy whites, and acid carried from the platinum bath into the hypo makes that bath too acid and causes bleaching and flat, yellow prints. Wash through two changes of water between baths, and large batches wash more thoroughly.

Final Washing.

After fixing, wash at least one hour in running water, or if washed by hand not less than one-half hour, handling the prints over and over, changing the water each time.

SEPIA TONES.

Monarch matte will produce the most perfect sepia tones of any printing-out paper manufactured when handled in the following manner:

Printing.

Print only a shade deeper than sepia tone desired; make no allowance for bleaching.

Washing.

Wash prints and handle through first water; in second water add 2 ounces of table salt to the gallon of water; wash in the salt water for 5 minutes, until prints redden up well, then wash through two more changes of water and tone in the following bath:

Gold Bath.

Monarch gold	1 dram.
Table salt	½ teaspoonful.
Sal soda enough to make bath slightly alkaline.	
Water	48 ounces.

Just clear the whites in this toning bath and place the prints in strong salt water, after which fix 12 to 15 minutes in hypo bath, 10° hydrometer test; add 2 ounces of salt to each gallon of fixing bath; do not be alarmed at color of prints in fixing bath. Prints

will wash out and dry down to a beautiful sepia. Final washing, as usual, must be thorough.

MONARCH GLACE—PURE COLLODION PAPER.

Printing.

Print a shade or two darker than print is desired, only slightly tinting the high lights. Change prints in subdued light.

Washing.

Wash thoroughly in slightly warm water, through five or six changes, or until the wash water shows no trace of silver.

Toning.

Make gold toning bath as follows:

Monarch gold	1 dram.
Water	60 ounces.

Make slightly alkaline (litmus test) with bicarbonate of soda for warm or purple tones, with borax for brown tones, with carbonate of soda for cherry tones.

Monarch glacé will be found the easiest on the market to tone, producing readily any tone desired by following the above directions.

Intermediate Washing.

Wash through two or three changes of water.

Fixing Bath.

Fix prints in a hypo bath of 15° hydrometer test for from 12 to 15 minutes.

Final Washing.

Wash prints after fixing in running water at least one hour, or half hour if washed by hand. Monarch glacé can also be toned to olive or carbon tones by double toning in the same manner as Monarch matte.

"ANGELO" PLATINUM PAPER.

This paper is handled in much the same way as any platinum paper, care being taken to keep it always in sealed tubes in a cool, dry place. The image comes up in printing more like printing-out paper than in most developing papers, and development is slower, which is a great advantage, as it gives more latitude in handling during development. Good results are obtained from any good all-round negative. Mr. Di Nunzio's formula for rich, warm black tones is as follows:

Neutral oxalate of potash	1 pound.
Hot water	100 ounces.

When cool, filter before using. When using old developer always filter before beginning work.

If more of blue-black is desired, it may be obtained by using a developing solution prepared by the makers of the paper, or the following formula may be employed:

Neutral oxalate of potash	14 ounces.
Phosphate of soda	2 "
Oxalic acid	1 dram.
Water	80 ounces.

Very warm black tones may be had by use of warm development, as follows:

Neutral oxalate of potash	1 pound.
Carbonate of soda	½ ounce.
Water	100 ounces.

SEPIA TONES may be obtained by using 16 ounces of the first-named developing solution, to which must be added 1 ounce of "Angelo" sepia solution. This bath should be used hot for best results, and the softest negatives will always give the best sepia prints.

WARM TONES ON "ANGELO" PAPER.

There is no necessity of a special paper for sepia tones. The regular "Angelo," as used for black and white, will give fine sepias or gradation of tones from warm black to terra-cotta color by use of the following formula:

Make prints and develop them as usual, but print a shade lighter than ordinary black and white, fix and give the usual final washing, then have two bottles:

I.

Nitrate of uranium	10 grains.
Acetic acid	1 dram.
Water	5 ounces.

II.

Red prussiate of potassium	10 grains.
Acetic acid	1 dram.
Water	5 ounces.

To make the sepia solution, mix equal parts of I. and II. in a dish and add 3 to 4 drops of saturated solution of sulphite of soda, then immerse the print that you wish to make sepia in this solution, the same as if you were toning, keep it in till you get the tone desired. After this operation rinse the print for a minute or two and put it for about five minutes in a dish of water acidified with acetic acid Prints are now ready to dry without any other washing.

By keeping prints in the sepia solution more or less time, different shades of warmth are obtained. If the prints are dried with blotters, keep them for sepias only.

Green Tones.

When prints are toned in the uranium bath put them without washing in a weak solution of ferric chloride. Keep them in till you get the color desired and rinse for a few seconds in clear water; then leave prints for about five minutes in water acidified with a few drops of acetic acid. After this dry prints without any more washing, as otherwise prints will not keep.

Engraved by *Photographed and Copyright,* 1900,
Grand Rapids Eng. Co., *by Wm. Weiss*
Grand Rapids, Mich.

STUDY OF A NATIVE BERMUDIAN

PLATINOTYPE PAPER.

Willis & Clements.

The paper is exposed to daylight, in the printing-frame, for about one-third of the time necessary for ordinary silver paper, until the detail is discernible in the whole print.

The print is then immersed in the developer for 30 seconds or more, then cleared in three acid baths containing 1 part of muriatic acid C. P. to 60 parts of water, washed for a short time in running water. The whole operation of printing, clearing, and washing being complete in about half an hour.

To secure the most brilliant results the sensitized paper, before, during, and after its exposure to light, must be kept as dry as possible.

It is necessary to place between the sensitized paper and the pads a sheet of thin india-rubber cloth; it is of the first importance that the pads in contact with the paper be quite dry.

The correct exposure (about one-third of that required with silver printing) is ascertained by inspection of the paper in a rather weak white light in the usual manner. A little experience will enable the exposure to be determined very accurately.

The sensitized surface before exposure to light is of a lemon-yellow color. During exposure the parts affected by light become of a pale grayish-brown color and sometimes of an orange tint under those parts of the negative which present clear glass or nearly so.

As a general rule, all parts of the picture except the highest lights should be visible when the exposure is complete.

When examining the prints in the printing-frames, care should be taken not to expose them unduly to light; for the degradation of the whites of the paper due to slight action of light is not visible until after development.

Damp paper gives a less visible image than dry paper, hence it may easily be overexposed.

When printing from thin negatives care must be taken not to overexpose. As soon as the image is faintly visible it may be considered enough.

Negatives that have been well timed, and developed to fair density, will be found the best.

A thin, weak negative will always give gray prints, but if the printing be done in the shade under one or two thicknesses of blue glass the prints will be more vigorous—brighter. On the other hand, negatives undertimed and developed full produce black and white prints without detail in the middle or higher lights. Such negatives should be held back in printing.

Development.

The whole contents of the box of developing salts prepared for use with this paper must be dissolved at one time, as the salts are mixed in definite proportions, and if this be not done too large a proportion of one of the ingredients may be used.

Development should be conducted in a feeble white light, similar to that used when cutting up the paper, or by gaslight.

It may take place immediately after the print is exposed, or at the end of the day's printing.

Develop by floating the print, exposed side downward, on the developing solution.

Development may take 30 seconds or more.

During the hot summer days it is not advisable to unduly delay the development of exposed prints. If possible, develop within one hour after printing.

Either porcelain or agate—preferably porcelain—dishes are necessary to hold the developing solution.

Remarks.

Generally speaking, the papers for cold development require a rather full exposure to light under the negatives.

Better results are perhaps secured by holding the print in the hand, face upward, and watching its development. The print should be first wetted by floating it on the developer. Stop development by plunging the print into the acid clearing bath as soon as the right effect is produced.

Always rock the developing bath, or stir the solution between each development; this will break up any scum which may be left by the previous print.

The developers may be warmed. At a temperature of about 100° F., underexposed prints may often be saved. It is usual for a warm developer to give rather warmer tones. It is not advisable to use a bath of a lower temperature than 60° F.

The bottom of the developing dish should be covered with the developing solution to the depth of at least one-half an inch.

After the prints have been developed put the solution, without filtering, into a bottle for future use; it should not be exposed to a strong light. When next developing, the solution will be found to be nearly clear, but, of course, tinted by previous use. If this clear solution be not sufficient for use, add to it some of the fresh developer. It is a safe plan always to keep the "bath solution" up to its original bulk by this means. A little suspended matter in the bath is not of any consequence.

The temperature of the bath should not be below 60° F., or above 100° F. If a lower temperature be used it tends to give coarse, granular prints; if too warm a bath be used it is liable to give brown tones in place of pure black, and often gives a muddy result.

Should prints be gray and granular, one of the following suggestions will be found to be the cause:

1. Insufficient development of the exposed print.
2. Granular and weak negative.
3. Developer too weak, or, possibly, too cold.

Clearing and Washing.

To clear the developed prints: these must be washed in a series of baths (not less than three) of a weak solution of muriatic acid C. P. This solution is made by mixing one part of muriatic acid with 60 parts of water. The specific gravity of the acid should be not less than 1.16; if lower, more acid should be used. The acid should be colorless. On no account should commercial muriatic acid be used. Citric acid, in the proportion of one ounce to twenty ounces of water, may be used. This softens the paper in less degree than does the muriatic acid. A white opalescence of the bath shows necessity for more acid.

As soon as the print has been removed from the developing dish it must be immersed face downward in the first bath of this acid, contained in a porcelain dish, in which it should remain about five minutes; meanwhile, other prints follow until all are developed. The prints must then be removed to a second acid-bath for about ten minutes; afterward to the third bath for about fifteen minutes. While the prints remain in these acid-baths they should be moved so that the solution has free access to their surfaces, but care should be taken not to abrade them by undue friction. It is impossible to affect the image *per se* by leaving the prints for a long time in the acid-baths; but such treatment, continued for an hour or more, tends to make the paper soft and porous, and to damage the surface of the paper.

The prints should not communicate to the last acid-bath the slightest tinge of color. If the bath, after the prints have been washed in it, does not remain as colorless as water when a depth of fully two inches is viewed in full daylight, the prints should be treated to yet another acid-bath.

Pure muriatic acid must be used.

If commercial muriatic acid be used, the prints will be discolored and turn yellow.

For each batch of prints fresh acid-baths must be used.

After the prints have passed through the acid-baths, they should be well washed in three changes of water during about a half hour. It is advisable to add a pinch of washing soda to the second washing water to neutralize any acid remaining in the print. Do not use water that contains iron, as it tends to turn paper yellow. Soft water is the best for this purpose.

Drying Platinotype Plates.

In establishments where a large number of prints are turned out daily, the best method is to hang the wet prints back to back on wires

stretched across the room, using Lockwood's photo clips to grasp the edges of the two prints. If hung up at the end of the day, they will be dry the next morning.

When a smaller number of prints are to be made at one time, a good plan is to blot off all excess moisture from them and place between clean, dry blotters, viz.: a blotter on the bottom, then a print, then a blotter, and so on, a weight being placed on the top of pile. This plan may also necessitate their being left in overnight.

Instructions for the Use of the Sepia Papers.

With a few exceptions the method of carrying out the operations is the same as for the "black" kinds of platinotype paper. The following points should be attended to:

The sepia paper is more easily affected by faint light, and, therefore, increased care must be taken when printing.

To develop, add to each ounce of the developing solution 1½ drams of sepia solution supplied for this purpose, and proceed as described for black paper.

The solution must be heated to a temperature of 150° to 160° F., to obtain the greatest amount of brilliance and the warmest color, but very good results can be obtained by using a cooler developer.

The development is effected by floating the printed surface of the paper for five or six seconds upon the developing solution. To avoid air-bubbles: lay one edge of the print upon the solution near the right-hand end of the dish; then, with a sliding motion toward the left, lower the print, with an even movement, without stoppage, until it is entirely in contact with the liquid, where it must remain until complete action has taken place.

The solution is conveniently contained in a flat-bottomed dish, heated by a small gas or oil stove.

It is advisable to put a thin piece of tin between the flame and the dish, to spread the heat.

Greater care must be used with sepia than with black paper, to avoid exposure to light, both when examining the prints and even in the first acid-bath, otherwise the whites will be discolored.

Discoloration of the whites is due to one of the following causes: 1. Too much exposure of the developing solution to light; 2. Use of a dish in which the enamel is cracked so as to expose the iron; 3. Paper kept too long; 4. Exposure of prints to too much light while clearing.

The developing bath after use must be kept in the dark. This bath must not be used for black prints.

The prints are cleared in an acid-bath of 1 part muriatic acid (sp. gr. 1.16) to sixty parts of water.

As the sepia prints, unlike the black ones, may be affected by light when in the acid-bath, the lights being stained and degraded,

the prints at this stage must be manipulated in a weak light—gaslight will be quite safe. The prints are damaged by being left long in the acid-baths.

The subsequent operations are the same as for the other kind of paper.

Agate baths or dishes, carefully heated, are the best to use for a sepia developer.

An agate dish which has been used once in developing sepia prints should on no account be afterward used in developing black toned prints.

MANIPULATION OF AMERICAN ARISTO PAPERS.

A large, clean, smooth-bottom tray should be used, and about one-half inch of water placed in it. The prints are now placed face down in this water, one at a time, by sliding them in one on top of another, and keeping them flat on the bottom. Be sure a print is thoroughly wet before another is placed on top of it.

After all prints are in, pour off water and put on fresh water. Keep prints flat and rock the tray for five minutes, pour off water and press them down with flat of hand, allowing all water to drain out. Now stand tray on edge and allow prints to drain for five minutes. Then pour plenty of water over them, and proceed to wash by separating prints and handling over.

ARISTO BLUE LABEL.

Printing.

Print but slightly deeper than desired when finished. Print deeper if dark tone is desired. If bold, good toning prints are desired print under two or three thicknesses of tissue.

Toning.

Blue label will work in any good gold bath if not too strong. Very little gold is required. If prints tone on margin quicker than in center, the bath is too strong, and should be reduced with water. A print should take at least six to eight minutes to reach a good warm tone. Fast toning gives weak color; slow toning a rich deposit of gold and a vigorous print. A neutral bath in which neither red nor blue litmus will change color gives the best average results.

In sections where the water is alkaline or very hard, simply gold and water is sufficient to make an effective bath; with rain or soft water add saturated solution of borax or any of the sodas to bring the bath to a neutral point. Never use a fresh bath; make it up several hours before using, and give it time to ripen.

After Toning.

As prints come from the toning bath, throw into a tray of water made slightly acid by a few drops of acetic acid. Some prefer a

slight salt solution. With small batches, running water will be sufficient.

Fixing.

Fix in hypo bath 10° to 12° hydrometer test, or one ounce saturated solution hypo to every 16 to 18 ounces of water. Have plenty of bath to cover prints thoroughly, and keep prints separated. Fifteen to twenty minutes will be sufficient time.

Final Washing.

Finally, wash carefully. It is the frequent and complete change of water that washes the hypo from a print, not continuous soaking. One hour in running water that changes completely every few minutes is sufficient, or seven or eight changes of water if prints are washed by hand.

ARISTO JUNIOR.

Print about two shades darker than desired when finished Flatten prints as directed, and wash through six changes of clear water, handling prints over each time, then tone in the following bath:

Salt	30 grains.
Saturated solution of acetate soda	½ ounce.
Aristo gold	1 dram.
Water	60 ounces.

Sal soda or borax, enough to turn red litmus paper blue in four or five minutes.

Make this bath up from four to five hours before use. Add gold enough to keep speed of bath six to eight minutes.

Tone in this bath to any point you desire prints when finished. After toning place in clear water. When ready to fix, rinse thoroughly through two clear waters.

Fix in plain hypo, 15 grains by hydrometer test, for fifteen minutes. Wash one hour in running water. Mount with any good fresh paste and dry quickly.

NOTE 1.—In cold weather always temper all water to about 65° or 70°.

NOTE 2.—The salt in the toning bath restrains the high lights from overtoning, and brings the high lights and shadows up clear at the same time, also saving the fine detail in white drapery.

NOTE 3.—Acetate of soda is a neutral salt. It will not make bath alkaline.

NOTE 4.—Muddy shadows and yellow whites and lack of brilliancy mean that your bath is too alkaline. Blue edges to the vignettes and bleaching in toning bath signifies an acid bath. Remedy: Add a few drops of alkali.

Aristo-Platino and Platinum Tones.

Printing.

Aristo Platino paper, in a general way, should be printed plain. Print until the high lights are well tinted. Pay no attention to the shadows, no matter how much they bronze. Do not be afraid of printing too deep.

Washing.

Wash through six changes of clear water, handling prints over each time. In washing paper there are two things to eliminate: the free silver and the keeping chemicals, and unless prints are thoroughly prepared for toning, they will not tone thoroughly and evenly.

The Gold Bath.

When prints are thoroughly washed, tone in the following bath to a purple, not a blue:

Salt	30 grains.
Aristo Gold	1 dram.
Water	60 ounces.

Borax enough to turn red litmus paper blue in three or four minutes.

The gold toning bath should be made up from four to five hours before use. Add enough gold to keep speed of bath six to eight minutes. Do not make the bath too strong, as the print will tone before the whites clear up.

After toning, throw prints into clear water until all are toned.

Washing After Gold Bath.

Wash prints in three changes of clear water by handling prints over. It is very important to wash prints thoroughly after they come from the gold bath. Never use the regular gold toning tray for platinum bath.

Toning in the Platinum.

After prints are washed, tone in the following bath:

Aristo platinum	3 to 5 drams.
Water	60 ounces.

Add platinum enough to keep speed of bath from eight to fifteen minutes.

When prints first go into this bath the whites become muddy. But in a short time they commence to clear up. Don't be afraid of leaving them in the platinum bath until the desired color and richness are obtained.

When prints come out of the platinum bath wash them thoroughly through three changes of water before fixing.

After prints are washed, fix in plain hypo, 18 grains strong, hydrometer test, for fifteen minutes, and then wash by hand through ten or twelve changes of water, and they are ready to mount.

Sepia Tones.

To make sepia tones on Aristo Platino, print about two shades darker than desired when finished. Wash through two changes of clear water; then place prints in a strong salt solution—2 ounces of salt to a gallon of water. Keep in salt water for five minutes, until they redden up. Then wash through two more changes of clear water, and tone in the following bath:

Aristo Gold	½ dram.
Water	60 ounces.

Sal soda enough to make red litmus turn blue in ten minutes.

Work this bath just slightly alkaline. Just clear the whites, and place in stop solution of salt water, after which fix for fifteen minutes in hypo bath, 10° hydrometer test. Add two ounces salt to each gallon of fixing bath. No matter if prints do look yellow in fixing bath, they will come all right in the washing and drying. All papers for sepia tones should be at least thirty days old.

Aristo Platino and Junior with Single Toner.

Printing.

The printing should be fully as dark as for double toning; print until the high lights are well tinted. Pay no attention to the shadows, no matter how much they bronze. Too light printing gives weak and bleached looking prints when finished.

Washing.

Prints should be washed in eight changes of clear water before toning to thoroughly remove all free silver. Handle prints over in each wash water; letting prints lie in running water for half an hour without handling is not as good, as some of the prints will not thoroughly wash.

Toning Bath.

After washing, tone in the following bath:

Single toner	2 drams.
Aristo Platinum	1 dram.
Water	32 ounces.

Prints should be toned in this bath until all trace of red has disappeared from the deepest shadows. If the toning is not carried fully this far you will not get pure whites or clear shadows, but prints will come out after fixing a dirty, muddy green color, with no brilliancy.

Washing After Toning.

Throw prints from toning bath into clear water until all are toned. Then wash in four changes of clear water, handling prints over in each wash water to thoroughly eliminate all acid before

fixing. Then fix in a plain hyposulphite of soda bath, 18 grains strong to the ounce, hydrometer test, for twenty minutes, handling prints during fixing to insure perfect results. After fixing, wash in ten to fifteen changes of clear water, or one hour in running water, handling prints over occasionally to insure thorough washing.

FOR VELOX PAPER.

PRINTING.—Open package of paper by gaslight or very subdued daylight.

An average negative requires ordinarily an exposure of from one to eight seconds to diffused daylight a few feet away from northern window; electric arc light requires about the same exposure. Welsbach gaslight needs several seconds more than an arc light; an ordinary gas jet, or a kerosene lamp, at a distance of three or four inches from negative, will yield a print in one or two minutes. Very dense negatives require much more time, while very weak ones require less. All "Special" Velox papers require less exposure than ordinary Velox. Use a strip of paper to ascertain the proper length of exposure before proceeding with regular printing, and keep your printing-frame always at the same distance from the light.

DEVELOPING.—After exposure, develop with any of the developers given below, at a safe distance of a few feet from an ordinary gas or lamp light. Ruby light is absolutely needless.

ESSENTIAL CONDITION OF SUCCESS.—Use strong and fresh developer, with just enough bromide to insure pure whites. More bromide gives greenish blacks. Before developing dip the sheet of paper for one or two seconds in water.

With any of the indicated developers development is very quick, except with "Special" Velox, and takes only a few seconds. In fact, you do not need a tray, as the exposed print may be put on a glass plate, and the developer spread abundantly and uniformly over its surface by means of a brush or a tuft of cotton. The image will appear suddenly; somewhat more slowly for all "Special" Velox papers. As soon as it is strong enough, dip quickly in water and throw into the following:

Hypo Acid Fixing Bath.

Hypo	16	ounces.
Water	64	"

Then add the following hardening solution:

Sodium sulphite, crystals	½	ounce.
Acetic acid, No. 8 (or about 4½ B)	3	ounces.
Powdered alum	½	ounce.
Water	5	ounces.

This mixture keeps perfectly clear, and can be made up any time in advance. It can be used as long as it is strong enough.

Keep your prints moving in the fixing bath during the first few seconds, so as to insure uniform and thorough fixing, thus preventing stains and yellow whites.

Fix ten or fifteen minutes, then wash from twenty minutes to one hour in running water. Longer fixing in summer may turn the prints brown. Imperfect washing will produce fading prints.

Developers.

Any of the following formulas may be used with success. Be sure, however, to have your chemicals pure, especially your sulphite, and not to let your developer become spoiled by oxidation; therefore, keep it in small, well-stoppered bottles, filled to the neck. Rubber stoppers are recommended. Too weak a developer, or one that is oxidized or contains too much bromide, will give greenish or brown blacks.

It is almost invariably necessary, in order to prevent foggy or stained whites in prints, to add a small quantity of a 10 per cent. bromide of potassium solution to the developer. This quantity will vary according to purity of chemicals and water. " Special " Velox can stand more bromide and further dilution than ordinary velox.

Metol-Quinol.

Metol	7	grains.
Sodium sulphite, crystals pure	½	ounce.
Hydrochinone	30	grains.
Sodium carbonate, desiccated	200	"
10 per cent. bromide of potassium solution, about	10	drops.
Water	10	ounces.

If crystallized sodium carbonate is used, take 400 grains.

Amidol.

Sodium sulphite, crystals pure	200	grains.
Amidol	20	"
10 per cent. bromide of potassium solution, about	5	drops.
Water	4	ounces.

Metol.

Metol	25	grains.
Sodium sulphite, crystals pure	½	ounce.
Sodium carbonate, desiccated	120	grains.
10 per cent. bromide of potassium solution, about	20	drops.
Water	10	ounces.

If crystallized carbonate of sodium is used, take 240 grains.

DIRECTIONS FOR USING EASTMAN'S ROYAL BROMIDE PAPER.

CONCENTRATED SOLUTION.

No. 1.

Oxalate of potash	1 pound.
Hot water	48 ounces.
Acetic acid	3 drams.

No. 2.

Proto-sulphate of iron	1 pound.
Hot water	32 ounces.
Acetic acid (or citric acid ¼ ounce)	½ dram.

No. 3.

Bromide potassium	1 ounce.
Water	1 quart.

These solutions keep separately, but must be mixed only for immediate use.

To develop:

Take in a suitable tray—No. 1, 6 ounces; No. 2, 1 ounce; No. 3, ½ dram.

Mix in the order given; use cold. After exposure, immerse print in water until limp; then flow on the developer.

The image should appear slowly, and should develop up strong, clear and brilliant. When the shadows are sufficiently black, pour off the developer and flood the print with the

CLEARING SOLUTION.

Acetic acid	1 dram.
Water	32 ounces.

Do not wash the print after pouring off the developer and before applying the clearing solution.

Use a sufficient quantity to flow over the print, say 2 ounces for an 8 x 10. Allow it to act for one minute, and pour it off and apply a fresh portion; repeat the operation a third time, then rinse in pure water and immerse for ten minutes in the

FIXING BATH.

Hyposulphite soda	3 ounces.
Water	16 "

After fixing wash thoroughly two hours and hang up to dry.

Details.

Use fresh developer for each large print or for each batch of several small prints which are developed together. With a glass tray 7 ounces of developer is sufficient for a 25 x 30 print.

Object of Clearing Solution.—The object of the clearing solution is to prevent the precipitation of the iron from the developer into the

fibre of the paper. This can only be done by keeping the paper acid while washing out the developer.

Citric Acid may be used instead of acetic in the clearing solution, in which case use ½ ounce to the quart of water. Citric acid is less liable to cause blisters.

Blisters sometimes appear in bromide paper, and may be avoided by using a little common salt in the first washing water after fixing. The hypo must not be stronger than three ounces to the pint of water.

Clean Dishes.—Clean Hands.—The faintest trace of hyposulphite of soda or of pyrogallic acid is fatal to good results with bromide paper, and the operator can not be too careful to avoid any contamination. The tray used for developing with oxalate should never be used for anything else.

FOR SEPIA TONES ON EASTMAN'S ROYAL BROMIDE PAPER.

Cold Hypo Toning Bath.

Directions.

By using the following formula rich brown and sepia tones can be readily obtained. The tones produced are believed to be permanent and not subject to the bronzing in the shadows which occur in bromides toned with uranium.

Formula.

Hyposulphite of soda	20	ounces.
Ground alum	4	"
Hot water	2	gallons.

Dissolve the hypo in the water first, then add the alum slowly; when all is dissolved the solution should be milk white. Allow it to settle, then decant the clear solution and use cold.

To Tone.—After prints are developed and fixed wash in three or four changes of water and then immerse in the cold toning bath, being careful to remove all air-bells. Immerse prints face down, sliding in one edge first to avoid air-bells. In putting several prints in bath slide them one by one underneath the first prints immersed. The print or prints should be handled over occasionally during the first four or five hours, and may then be left in the bath over night or until the desired tone is acquired.

After toning wash thoroughly two hours and hang up to dry.

Details.

Prints must be thoroughly fixed before toning.

Prints should be toned face down.

Solution may be used repeatedly by adding fresh bath occasionally.

A number of prints can be toned in one bath at the same time.

Spots or unevenness in the tone will disappear if print is left in the bath and occasionally moved.

The toning takes from 15 *to* 20 *hours.*

DIRECTIONS FOR USING EASTMAN'S SOLIO PAPER.

Separate Bath Formula.

Wash in 5 or 6 changes of water or sufficient to remove the free silver.

Tone in a plain gold bath, using about 1 grain of gold to 48 ounces of water. Neutralize by adding a saturated solution of borax, bicarbonate of soda, or sal soda.

When toned, immerse prints in running water, where they may remain until all are ready for the fixing.

If running water can not be had put prints into

Short Stop.

Salt	1 ounce.
Water	1 gallon.

If there is a large batch of prints to be toned do not allow prints to lie in short stop solution, but put them into a tray containing clear water, where they may remain until all are ready for the fixing.

Fix twenty minutes in

Water	1 gallon.
Hypo	13 ounces.
Solio Hardener	½ ounce.

To mix with hydrometer, take water 1 gallon, add sufficient hypo to test 25 grains to the ounce, and add ½ ounce of Solio Hardener.

Alum Fixing Bath.

Hyposulphite of soda	6	ounces.
Alum (crystals)	2½	"
Sulphite of soda (crystals)	⅜	ounce.
Water	70	ounces.

When dissolved add ¾ ounce of borax dissolved in 10 ounces hot water.

This fixing bath must be made about ten hours before use. As it keeps indefinitely before use it may be made up in large quantities.

Wash one hour in running cold water or in 16 changes of cold

water, keeping prints separated so the water may have a chance to eliminate the chemicals.

Details.

The toning bath should tone in 6 or 7 minutes.

Tone by transmitted light for the high lights and half tones only, paying no attention whatever to the shadows.

A neutral bath is best.

If the bath tones uneven or streaky, add water until it tones in 8 or 10 minutes, and make it slightly alkaline.

One gallon of fixing bath is sufficient for one gross cabinet size Solio or its equivalent.

To make Solio Hardener:

Chloride of aluminum	3	ounces.
Bisulphite of soda	2½	"
Cold water	12	"

Put both chemicals in the water and shake until dissolved.

Combined Toning Bath.

Stock solution:

A.—Hyposulphite of soda	8	ounces.
Alum (crystals)	6	"
Sugar (granulated)	2	"
Water	80	"

Dissolve above in *cold water,* and

When dissolved add borax	2	ounces.
Dissolved in hot water	8	"

Let stand over night and decant clear liquid.

Stock solution:

B.—Pure chloride of gold	7½	grains.*
Acetate of lead (sugar of lead)	64	"
Water	8	ounces.

Solution B should be shaken up before using and not filtered.

To tone 15 cabinets take:

Stock Solution A	8	ounces.
Stock Solution B	1	"

Place prints without previous washing into the above.

Tone to desired color and immerse prints for 5 minutes in following salt solution to stop the toning:

Salt	1	ounce.
Water	32	"

The extra fixing bath should be used to insure ***thorough fixing.***

* Or double the quantity of chloride of gold and sodium.

After the salt bath give one change of cold water and fix for 10 minutes in the

Extra Fixing Bath.

Hyposulphite of soda	1 ounce.
Sulphite of soda (crystals)	60 grains.
Borax	1/4 ounce.
Water	20 ounces.

Wash one hour in running cold water or in 16 changes of cold water, when prints may be mounted same as albumen prints.

The combined bath must be used cold, not above 50° F. This condition can be obtained by placing a piece of ice in the bath when toning. If the bath is too warm it will cause yellow prints with a greenish cast in the half tones.

Use a thermometer and keep it in toning bath all the time.

The combined bath is an acid solution. The borax neutralizes only the *excess* of acid in the alum. Any attempt to neutralize the bath will precipitate the alum.

The combined bath should not be used a second time.

Clean trays once a week with nitric acid or sulphuric acid and water to prevent white spots or blotches on the prints.

DIRECTIONS FOR USING EASTMAN'S DEKKO PAPER.

Light.—Dekko paper may be safely handled for purpose of placing in printing frame and developing, eight to ten feet away from ordinary full flame artificial light or three or four feet away if light is turned low. With Welsbach gaslight and daylight it is necessary to reduce the light somewhat by shading the lamp or window with one thickness of orange post-office paper. If there is a yellow tinted or dark shade on window, the post-office paper need not be used.

Making Exposure.—Place the paper in contact with negative in a printing frame, make exposure while holding the printing frame at a distance of about six inches from artificial light or two feet from a window covered with one thickness of tisue paper. The length of exposure varies with the density of negative and strength of the light. With artificial light, using the same negative, the various lights may be approximately compared as follows:

Welsbach gaslight—strongest.

Incandescent light—about one-half as strong as Welsbach gaslight.

Ordinary gaslight—slightly weaker than incandescent light.

Oil lamp of ordinary size—about one-third as strong as an ordinary gas burner.

With a negative of medium density expose three to five minutes at a distance of from six to eight inches from an ordinary gas burner.

On account of its uniformity, artificial light is recommended in preference to daylight, as, once the amount of exposure with a given artificial light is ascertained, it becomes easy to approximate the amount of time necessary to properly make subsequent exposures; the only variation of time which it is necessary to make being that required by the variation in density of different negatives.

Developers for Dekko.

Metol-Hydrochinone.

Metol	7 grains.
Hydrochinone	30 "
Sulphite of soda	½ ounce.
Carbonate of sodium	400 grains.
Water	10 ounces.

Dissolve and add about 5 drops of a solution composed of bromide of potassium ½ ounce, water 5 ounces. This solution is to be used without diluting.

Amidol.

Amidol	80 grains.
Sulphite of soda (crystals)	200 "
Water	10 ounces.

For use, take 1½ ounces of above stock solution, 3 ounces of water, and add 3 to 5 drops of bromide of potassium solution made of bromide of potassium ½ ounce, water 5 ounces.

To develop:

First immerse prints for a few moments in water, then pour off the water and flow over with either one of above developers. The image will appear in about one second, and, when print has been properly exposed and developer is of right strength, the print will be developed in about 5 seconds from time developer is flowed over same. As soon as image has progressed sufficiently far, remove quickly to following fixing bath.

Fixing Bath.

Hyposulphite of soda	4 ounces
Alum (crystals)	1 "
Water	16 "

Fix for 15 minutes, keeping prints separated. When fixed, transfer to washing tray.

Washing.—Wash one hour in running water or in 12 to 15 changes of clear water, giving 4 or 5 minutes for each change.

Mounting.—Dekko prints should be mounted wet. Lay the wet print face down on table covered with oil or rubber cloth or on sheet

Engraved by
Photochromotype Engraving Co.,
Philadelphia, Pa.

By J. H. Tarbell.

A SOUTH CAROLINA HOUSEWIFE.

of glass, and squeegee off all the surplus water, then brush over the back with starch paste, lay the print on the mount, then cover the print with a clean piece of blotting paper and rub into contact.

Flexible Prints.—Dekko prints soaked in a mixture of glycerine 5 ounces and water 25 ounces, and dried, will not curl, and may be used for book illustrations unmounted.

Straightening Unmounted Prints.—After drying, prints may be straightened by the scraping action of a sharp edge ruler applied to the back; the corner behind the ruler being lifted as the ruler is passed along.

Standard Formula for Developing Papers.

One Ounce.

Tolidol	5	grains.	
Sulphite of Soda, dry	22	"	(or 45 gr. crys.)
Carbonate of soda, dry	15	"	(or 37 gr. crys.)
Water	1	ounce.	

Sixteen Ounces.

Tolidol	80	grains.	
Sulphite of Soda, dry	360	"	(or 720 gr. crys.)
Carbonate of soda, dry	240	"	(or 600 gr. crys.)
Water	16	ounces.	

Always add sufficient retarder to keep the whites on the prints clear for one minute. This will insure fine blue blacks, and more will change the color of the half-tones and shadows to green and brown.

Albumen Paper.

Toning Solution.

Chloride of gold	1 grain.
Acetate of sodium	30 grains.
Water	8 ounces.

This must not be used till one day after preparation. It keeps well and gives warm, rich tones.

Another.

Chloride of gold	1 grain.
Bicarbonate of sodium	4 grains.
Water	8 ounces.

This is ready for immediate use after preparation, but it will not keep.

Another.

Chloride of gold	1 grain.
Phosphate of sodium	20 grains.
Water	8 ounces.

This gives rich tones of a deep purple nature, but must be used soon after preparation.

Another.

Gold solution	10 drams.
Acetate of lime	20 grains.
Chloride of lime	1 grain
Tepid water	20 ounces.

The "gold solution" before mentioned is prepared by neutralizing as much as is required of a one-grain solution of chloride of gold by shaking it up with a little prepared chalk, then allowing it to settle, and filtering off the clear liquid. This toning bath improves by keeping. To use, add two ounces of it to eight ounces of tepid water, which will prove sufficient to tone a full-sized sheet of paper.

Another.

Chloride of gold	15 grains.
Water	5 ounces.

Neutralize with lime water, make up to fifteen ounces with water, and add two drams of chloride of calcium. This stock solution will keep for a long time. For use, dilute one ounce with ten ounces of water.

Combined Toning and Fixing Baths.

Hyposulphite of soda	3 ounces.
Nitrate of lead	60 grains.
Chloride of gold	6 "
Water	24 ounces.

Gaedicke.

Hyposulphite of soda	200 grams.
Boric acid	30 "
Lead nitrate	15 "
Sulphocyanide of ammonium	20 "
Chloride of gold, 1 : 200	60 c. c.
Water	1000 "

Another.

Chloride of gold	1 grain.
Phosphate of sodium	15 grains.
Sulphocyanide of ammonium	25 "
Hyposulphite of sodium	240 "
Water	2 ounces.

Dissolve the gold separately in a small quantity of water, and add it to the other solution.

No-Gold Combined Bath.

Hypo	6 ounces.
Washing soda	1/4 ounce.
Lead acetate	1/2 "
Water	1 quart.

No. 1.

Citrate of iron and ammonia	1⅞ ounces.
Water	8 "

No. 2.

Ferricyanide of potassium	1¼ ounces.
Water	8 "

Mix equal parts of No. 1 and No. 2, and apply with brush or by floating for three minutes. Plain Rives paper should be used; hang up to dry in darkened room.

Black Lines upon a White Ground.

Gelatine	3 drams.
Perchloride of iron solution (U. S. P.)	6 "
Tartaric acid	3 "
Ferric sulphate	3 "
Water	9 ounces.

Filter off any precipitate that may be found, and coat any good, stout, white paper with the full-strength solution. Expose in sunlight till details or lines are visible, and develop with

Gallic acid	6 drams.
Alcohol	6½ ounces.
Water	32 "

Wash well in several changes of water.

The sensitizing solution is as follows:

Gum arabic	15 grams.
Tartaric acid	2 "
Chloride of sodium (common salt)	9 "
Sulphate of iron	10 "
Iron perchloride	15 "
Water	110 c. c.

In mixing the solution, the gum arabic is first dissolved in the water by the aid of heat, and the other salts are added while the solution is still warm.

The solution is spread over the surface of the paper with a sponge, and, after allowing a little time for it to penetrate the surface, all superfluous moisture is removed, using the sponge again, well wrung out. If this precaution be not attended to, the depth of the lines is not equal. The paper is then dried as quickly as possible. If the drying is not rapid, the whites stain.

Exposure is somewhat longer than would be needed with sensitized albumenized paper. The color of the sensitized paper is yellow. During exposure all but the lines turn to white.

Development is by a plain aqueous solution of gallic acid, the strength of which is not important. Care must be taken not to

leave the print too long in the developer, otherwise staining will result. After development the print is rapidly washed, when superfluous moisture is carefully sponged off the surface. If this precaution be not observed, inequality in the depth of the lines will result.

MISCELLANEOUS FORMULAS.

MOUNTANTS

Best thin glue	3 ounces.
Golden syrup	¾ ounce.
Alcohol	3 ounces.
Water	3 "

Soften the glue in two ounces of the water; heat gently in a pan of hot water, add the syrup (refined molasses), add the other ounce of water to the alcohol, and pour into the jar under constant stirring.

JARECKI'S.

A.

Wheat flour	3½ ounces.
Water	8 "

B.

Salicylic acid	15 grains.
Water	12 ounces.

Stir the flour with the eight ounces of water. Boil the other twelve, add the salicylic acid, and stir in A.

Non-Cockling Paste.

Nelson's No. 1 gelatine	4 ounces.
Glycerine	1 ounce
Alcohol	5 ounces.
Water	16 ounces.

Dissolve the gelatine in the water, add the glycerine, and then the alcohol.

COL. J. WATERHOUSE'S DEVELOPER FOR PRODUCING REVERSED NEGATIVES.

A.

Lithium carbonate sat. sol.	1 ounce.
Eikonogen	5 grains.
Sodium sulphite	5 "

Dissolve the two latter in the first just before using it, and add a few drops of

B.

Ammonium bromide	1 part.
Thiocarbamide	3 parts.

Dissolve in water.

To Clean Negatives Stained by Silver.

Take a plug of cotton-wool and wet it well with a weak solution of cyanide of potassium; rub gently all over the negative, using a little more force on the stained parts. Wash well. Dry on blotting-paper. If necessary to revarnish, flood the plate once or twice with methylated spirit. Let dry, and then varnish in the ordinary way.

To Remove Yellow Stains Caused by Developer.

Sulphate of iron	3 ounces, or	90 grams.
Sulphuric acid	1 ounce, "	30 c. c.
Alum	1 " "	30 "
Water	20 ounces, "	600 "

If, after developing and fixing the negative, it is found to be stained yellow from the pyro or hydrochinone developer, first wash well to remove all hyposulphite, then immerse in above solution until the stain is removed; again wash well and dry.

Clearing Baths for Negatives Colored Yellow by Pyro Developer.

Immerse the negative in the following solution until the yellow fog disappears:

Sulphate of iron	75 grams.
Citric acid	25 "
Alum	25 "
Water	500 c. c.

To Remove Silver Stains from Negatives.

Iodine	5 grains.
Potassium iodide	20 "
Water	½ ounce.

When the iodine is dissolved, add, while stirring, a few drops of a strong solution of hypo until solution becomes colorless. Apply to the spot with the soft end of a finger or a tuft of absorbent cotton, rubbing gently. Rinse well and dry.

Soaking Solution for Films.

BLAIR.

Alcohol	4 ounces.
Glycerine	½ ounce.
Water	16 ounces.

EASTMAN.

Glycerine	1 ounce.
Water	32 ounces.

To Strip Film from Ordinary Plates.

Give negatives two coats of 2 per cent. collodion. The following formula yields good results:

Negative cotton	30 grains,	or	2 grams.
Ether	1 ounce, 6 drams,	"	50 c. c.
Alcohol	1 " 6 "	"	50 "

Allow the first coat to dry before applying the second, and when second coating has set, place immediately in cold water until greasiness has disappeared, then place in a bath of

Sodium fluoride (com.)	5 drams,	or	20 grams.
Water	5 ounces,	"	160 c. c.

When thoroughly saturated with this solution, which will take at least an hour, place without washing in

Sulphuric acid	1 dram,	or	4 c. c.
Water	7 ounces,	"	196 "

Rubber trays should be used for this and the fluoride bath. When film begins to loosen, lay a piece of writing-paper or celluloid upon it as a support, and separate the two from the glass. After washing well under tap it can be transferred to a permanent support.

The following will answer the purpose: Coat a clean glass plate which has been rubbed with French chalk and dusted, with

Gelatine	2½ ounces,	or	75 grams.
Glycerine	3 drams,	"	10 c. c.
Water	16 ounces,	"	500 "

Filter before coating through Canton flannel, and avoid air bubbles. Coat on a leveling stand as thick as the plate will hold; allow to set and dry.

Clearing Solution.

Powdered alum	60 grains.
Sulphuric acid	60 minims.
Water	20 ounces.

A Substitute for Varnishing.

Alum	2 ounces.
Tannic acid	1 dram.
Water	16 ounces.

Immerse negative for from three to five minutes; too long an immersion will loosen the film. Films so treated are almost waterproof.

Varnish for Celluloid Films.

Powdered amber	5 parts.
Chloroform	45 "
Coal-tar benzine	45 "
Gum dammar	7½ "

The mixture should be allowed to stand in a warm place for some time, and should be decanted twice before using.

Ground Glass Varnish.

Sandarac	90 grains.
Mastic	20 "
Ether	2 ounces.
Benzole	½ to 1½ "

The proportion of the benzole added determines the grain of the matt obtained.

Retouching Varnishes.

Sandarac	1 ounce.
Castor oil	80 grains.
Alcohol	6 ounces.

First dissolve the sandarac in the alcohol, and then add the oil.

Another.

Copaivic acid	¼ gram.
Dammar	½ "
Ether (strongest)	50 c. c.
Gasoline	120 "

Dry the dammar by heating until melted. When quite cold, powder, and dissolve in the ether. Then add the copaivic acid and finally add the mixture to the gasoline.

Another.

Gum dammar	1 part.
Oil of turpentine	5 parts.

Another.

Strong solution of gum myrrh in oil of turpentine.

Negative Varnishes.

Sandarac	4 ounces.
Alcohol	28 "
Oil of lavender	3 "

Another.

Bleached shellac	1¼ ounces.
Mastic	¼ ounce.
Oil of turpentine	¼ "
Sandarac	1¼ ounces.
Alcohol	20 fluid ounces.

Another.

Gasoline	1 quart.
Balsam fir	1 dram.
Resin	50 grains.

Another.

Spirits turpentine	8 ounces.
Powdered rock candy	2 teaspoonfuls (large).

Shake well and let stand a day. Add sufficient resin to make saturated solution. Then add:

Alcohol	2 ounces.
Balsam fir	4 "

If too thick for use, reduce by adding turpentine.

Silvering Mirrors.

The glass plate to be silvered must be absolutely clean.

A.—Silver nitrate	175 grains.
Distilled water	10 ounces.
B.—Nitrate of ammonium	262 grains.
Distilled water	10 ounces.
C.—Pure caustic potash	1 ounce (avoir.)
Distilled water	10 ounces.
D.—Pure sugar candy	½ ounce.
Distilled water	5 ounces.
Dissolve and add:	
Tartaric acid	50 grains.

Boil in a flask for ten minutes, and, when cool, add:

Alcohol	1 ounce.
Distilled water to make	10 ounces.

For use, take equal parts of A and B. Mix together also equal parts of C and D, and mix in another graduate. Then mix both together in the silvering vessel, and suspend the mirror, face down, in the solution.

Coloring Photographs.

The finely powdered colors are mixed with the following:

Filtered albumen	100 c. c.
Ammonium carbonate	5 grains.
Glycerine	3 c. c.
Liquid ammonia	4 "
Water	25 "

Black for Woodwork.

Shellac	40 parts.
Borax	20 "
Glycerine	20 "
Water	500 "

After dissolving, add 50 parts aniline black.

For Writing on Glass.

Bleached shellac	2 parts.
Venice turpentine	1 part.
Oil of turpentine	3 parts.
Lampblack	1 part.

Warm the first three ingredients together over a water-bath, and then stir in the lampblack, incorporating thoroughly.

Engraved by
H. J. Ormsbee Engraving Co.,
Syracuse, N. Y.

By Sarah J. Eddy

THE MILLER

Printing on Silk.

Wash the silk in warm water, and float for two minutes on the following solution:

Salt	10 grains.
Ammonium chloride	10 "
Ammonia	15 drops.
Water	1 ounce.

Then hang the silk up to dry. Sensitize in

Silver nitrate	150 grains.
Water	1 ounce.

After floating on this for two minutes, dry, print deeply, tone, fix, and wash in ordinary manner.

A Good Toning Bath for Above.

A.

Sodium acetate (doubly fused)	36	grains.
" " (crystallized)	36	"
Borax (powdered)	17½	"
Distilled water	10	ounces.

B.

Gold and sodium chloride	4½ grains.
Distilled water	½ ounce.

One hour before using mix both solutions, and filter.

Fixing Bath.

Sodium hyposulphite	1 ounce (437.5 grains.)
Distilled water	10 ounces.

Test for Hypo in Wash Water.

Permanganate of potash	3 grains.
Caustic soda	15 "
Water	16 ounces.

A few drops of the water to be tested is mixed with a few drops of this solution. If hypo is present, the red color will change to green.

To Avoid Pyro Spots on the Hand.

Wash the hands in a diluted solution of citric acid, and when dry put them in clear glycerine. Under this treatment, the pyro will have no effect on the hands.

Albumen Plates for Projection Pictures.

Dissolve 5 grams iodide of potassium and 0.25 gram resublimed iodine in 500 cubic centimeters of albumen. Beat this to a foam,

let it settle for twenty-four hours, and coat the glass plate with the clear solution. When dry, sensitize the albumenized plate in the dark room in the following solution:

Nitrate of silver	10	grams.
Acetic acid	10	"
Water	100	"

The exposure of such a plate under a negative requires only a few minutes. Develop with gallic acid.

Cold Developing Baths for Platinum Paper.

	I.	II.	III.
Neutral oxalate of potassium	300	900	135
Glycerine	375	...	...
Phosphate of potassium	...	30	50
Sulphite of soda	...	4	4
Water	1,000	960	960

Note to No. I.: The glycerine is to be added after solution of the salts and after filtration. The formula is particularly suitable for hard negatives.

No. II. is intended for brilliant negatives.

No. III. is more suitable for soft and thin negatives. Solution I. gives blackish-brown; II. and III., blue-black tones.

To Paste Paper upon Metal.

Clean the surface with a washing soda solution, to remove all fatty substances, dry well, and apply the juice of onions. Paper or photographic pictures pasted on metal treated in that way will stick, and can not be removed again.

A new Fixative for Crayon Drawings is the following:

Gelatine	4.5	grams.
Acetic acid	8	c. c.
Alcohol	35	"
Water	25 to 30	"

This solution is put on the reversed side of the drawing with a sponge or brush. It will penetrate the paper quickly to the drawing and unite the same with its support.

Waterproof Negatives.

A coating with ordinary negative varnish, prepared of some resinous substance, like gum sandarac, will not protect a negative from the influence of moisture. But the film can be completely protected from moisture if a solution of 3 parts of paraffine in 7 parts of benzole is applied with a brush. When dry, heat the plate and polish with a soft cloth. The gelatine will take up so much paraffine on the surface that it will be completely waterproof. But it will admit no retouching in this condition. Therefore another

contiag of negative varnish is given. This will increase the protection against moisture, and give a suitable underground for retouching.

Photographic Impressions upon Ivory.

Being suitable as prints for miniature painting, can be made by applying the following solution with a brush:

Nitrate of silver	3 grams.
Nitrate of uranium	30 "
Alcohol	100 c. c.
Distilled water	10 "

The ivory plate is then dried in the dark, and in daylight exposed under a negative in the printing-frame. After the print has become sufficiently strong, it is fixed in water to which has been added some nitric acid, washed with pure water and then dried. It is, of course, necessary that the surface of the ivory plate is completely clean; the slightest trace of fatty matter or moisture would be the cause of spotty pictures.

Rapid Washing of Negatives.

The washing of negatives can be accelerated considerably if, after fixing, they are put for a short time in a solution of

Acetate of lead	90 grams.
Water	500 c. c.

This solution keeps well. Let it stand for some time, and then further dilute 90 cubic centimeters of the solution with 1,000 cubic centimeters of water, and use this diluted solution as a washing bath.

Varnish for Plate-Holders and Camera Interiors.

Bleached shellac	5 ounces.
Borax	1 ounce.
Water	20 ounces.

Digest at nearly boiling point until dissolved; filter through muslin.

Another.

Shellac	4 ounces.
Borax	1 ounce.
Glycerine	½ "
Aniline black	2 ounces.
Water	20 "

Color Screen.

Saturated alcoholic solution of "brilliant yellow"	4 ounces.
Pyroxyline	40 grains.
Ether	4 ounces.

Comparative Strength of Various Lights.

Gas flame	1
Oxyhydrogen light	11
Magnesium ribbon	58
Diffused daylight	268
Electric light	5179
Sunlight	16079

ORTHOCHROMATIC SENSITIZING BATHS.

Victor Schumann.

Alcohol	10	parts.
Ammonia, 90°	4	"
Alcoholic solution of cyanine, 1 : 200	10	"
Distilled water	200	"

Immerse the plate in water containing a little ammonia (3 parts per 100) for two or three minutes, and then place in the above solution, drain, and dry.

Mallman and Scolik.

Preliminary Bath.

Ammonia	2	c. c.
Water	200	"

Soak the plate for two minutes.

Color Bath.

Erythrosin solution, 1 : 1000	25	c. c.
Ammonia	4	"
Water	175	"

The plate should not remain longer in this bath than one and a quarter minutes. A longer time reduces the general sensitiveness.

Another.

Alcohol	500	c. c.
Chinoline red	1	gram.

To which add 50 c. c. of a solution of

Alcohol	500	c. c.
Chinoline blue (cyanine)	1	gram.

The above solution is identical with the liquid dye sold under the name "azaline."

Another.

Bathe the plates for about two minutes by a very feeble red light in

Erythrosin solution, 1 : 1000	50	parts.
Distilled water	100	"
Silver nitrate solution, 1 : 1000	50	"
Ammonia, sp. gr. 0.96	2	"

Keep this solution in the dark-room. These bathed plates will remain clear for about seven days.

Color Screen.

Aurantia	0.3	part.
Warm alcohol	50	parts.
Ether	50	"
Pyroxiline	2	"

Dissolve the aurantia (not aurine) in the alcohol, then add the ether and pyroxiline, and filter. Coat thin polished plate glass, and attach to inner side of lens board. If not dense enough, coat again, or use two screens together. The darker the screen the longer the exposure, but the better the orthochromatic effect.

Green Toning of Bromide of Silver Pictures.

For certain landscapes, marine views, moonlight effects, etc., a pronounced green tone is often suitable. To obtain this tone, make a solution of 15 cubic centimeters of acetic acid in 150 cubic centimeters of water, divide the same into three equal parts and dissolve 0.5 gram yellow prussiate of potassium in one, 0.5 gram of acetate of uranium in the second, and 0.5 gram chromatic oxide of iron in the third part. After complete solution pour the contents of the three dishes into a tray, mix well and put the picture into this solution, leaving it in there until the desired tone has been obtained. Afterward wash well. The whole process should be worked in subdued (candle or kerosene) light.

Collodion Dry Plates for Diapositives.

On account of their extraordinarily fine grain, collodion plates always meet with much favor for diapositives. To prepare such an emulsion for collodion dry plates, the following process is recommended: The glass plate is first coated with a supporting rubber solution, and is then prepared with ordinary negative collodion and sensitized in a silver bath, consisting of

Nitrate of silver	100	grams.
Nitric acid	15	drops.
Five per cent. iodide of potassium solution	5	c. c.
Distilled water	1	liter.

It is then treated with a 3 per cent. tannin solution, and dried. Expose four to ten minutes in front of a kerosene light at a distance of about 50 centimeters, and develop with a solution of

Pyro	1 gram,
Citric acid	1 "
Water	300 grams,

to which is added, before use, 5 cubic centimeters of a 1 per cent. nitrate of silver solution to each 30 cubic centimeters solution. The sensitized plates must be kept in the dark, and are durable for three to four weeks. The diapositives should be well varnished, to prevent injury.

Reversed Negatives by Overexposure.

A highly sensitive gelatine plate, and the negative to be reproduced, are put into a printing-frame, film to film, and the back of the plate covered with a piece of black paper. Red light is not required for this manipulation, yellow light being sufficient. The exposure takes place in diffused daylight, preferably in an ordinary room, at a distance of ten to twelve feet from the window. The exposure lasts from ten to twenty minutes, according to the density of the negative. A mixed hydrochinone-eikonogen developer, which is least likely to cause fog, is used. The following formula is said to give very good results:

Eikonogen	10 grams.
Hydrochinone	10 "
Sulphite of soda	100 "
Water	1,000 c. c.

This solution is poured into a tray, the plate is immersed for a few minutes, and a saturated solution of ordinary washing soda is gradually added. As soon as the picture appears, no more soda is added, and the development proceeds, until the high lights are sufficiently developed. This requires about a quarter of an hour. The further treatment of the plate is in the ordinary way.

Warm-Brown Tones on Bromide of Silver Plates for Projection and Window Decoration.

With pure bromide of silver, at least in the fine-grained modification, the tone of the picture, as is well known, depends upon the time of exposure and concentration of the developer. Short exposures and intense developers give black or olive-green tones; long exposures and weak developers, brown to red tones. If, for instance, at an exposure of thirty seconds, a pure black tone is obtained, a brown tone is possible on the ordinary diapositive plates, at sixty seconds' exposure, by applying a suitable developer, a dark purple at ninety seconds, a brilliant purple in three minutes, and red in five minutes. The following hydrochinone developer yields pure and brilliant tones:

Solution I.

Hydrochinone	7.5 grams.
Citric acid	4 "
Bromide of potassium	2 "
Water	300 c. c.

Solution II.

Caustic soda	7.5 grams.
Sulphite soda	38 "
Distilled water	300 c. c.

Solution III.

Bromide of ammonium	15 grams.
Carbonate of ammonia	15 "
Distilled water	300 c. c.

The warmer the tone is desired, the more of Solution III. is mixed to equal parts of Solutions I. and II., and the developer is diluted with an equal quantity of distilled water. The time of development varies from 5 to 15 minutes.

PROCESS FORMULAS.

Collodion.

Alcohol	8 ounces.
Ether	10 "
Cadmium iodide	52 grains.
Ammonium iodide	32 "
Strontium chloride	10 "
Calcium chloride	10 "
E. A. red label cotton	80 "

Developer.

Protosulphate of iron solution	Hydrometer 20°.
Acetic acid	1 ounce to 16 ounces of iron solution.
Alcohol	sufficient to make developer flow smoothly

Intensifier.

Copper sulphate	1 ounce.
Potassium bromide	1/4 "
Water	16 ounces.

Clearing solution, nitric acid 1, to 10 water. Black with silver nitrate solution, hydrometer 20°.

Copying Collodion for Line Work.

Ether and alcohol	Equal parts.
Anthony's snowy cotton	6 grains to 1 ounce.
Brown iodide of ammonium	4 " " "
Bromide of cadmium	1 grain " "

A GOOD HALF-TONE ENAMEL.

By H. Woodbury Shaylor, Jr.

A.—Eggs (albumen)	6	ounces.
Water	24	"
B.—Ammonium bichromate	270	grains.
Water	16	ounces.
C.—Le Page's glue	16	ounces.
D.—Ammonia	4	drams.

Take the albumen of sufficient eggs, say six or seven, to make six ounces, and put them in a large bowl, beating with an egg-beater to a stiff froth, then add eight ounces of water, and beat again thoroughly. Keep adding water until you have used the twenty-four ounces.

Powder in a mortar your ammonium bichromate, and dissolve in sixteen ounces of water, adding the water gradually.

Take sixteen ounces of Le Page's glue, mix with the albumen solution, and add slowly the bichromate solution. With the egg-beater beat vigorously for four or five minutes to insure perfect assimilation.

If you wish to use the solution immediately, add four drams of liquid ammonia; but, if convenient to let stand a few days, do not add the ammonia. It is necessary to filter the solution two or three times before using. This solution will keep two weeks or even longer, and will work nicely.

Enamel Solutions.

Clarified fish glue	1	ounce.
Pure gum arabic	1	"
Albumen	1	"
White rock candy	1/4	"
Ammonium bichromate	1/2	"
Aqua ammonia	20	drops.
Water	6	ounces.

Another.

No. 1.

Le Page's glue	3	ounces.
Albumen	1	ounce.
Ammonium bichromate	80	grains.
Water	4	ounces.

No. 2.

Gum acacia	1/2	ounce.
Aqua ammonia	1/4	"
Water	8	ounces.

No. 2 solution will keep; No. 1 will not. For use, mix 3 ounces of No. 1 with 1 ounce of No. 2.

Engraved by
H. J. Ormsbee Eng. Co.,
Syracuse, N. Y.

Photographed and Copyright, 1899,
by W. H. Partridge

THE SANDMAN

Another.

Fish glue	2 ounces.
White of egg	1 ounce.
Ammonium bichromate	60 grains.
Chromic acid	10 "
Liquid ammonia	1/4 ounce.
Water	2 ounces.

Another.

Fish glue (Le Page's clarified)	1 ounce.
White of egg	1 "
Ammonium bichromate	30 grains.
Water	1 ounce.

Etching Solution.

Saturated solution common alum	40 ounces.
Nitric acid	1 ounce.

Albumen Sensitizing Solution.

White of two eggs (beat to froth with an egg-beater).

Water	8 ounces.
Ammonium bichromate	30 grains.
Water	8 ounces.

Allow to stand over night, and filter before using.

FOR ETCHING ON STEEL.

Spencer Acid.

No. 1.

Nitric acid	5 ounces.
Water, distilled	5 "
Pure metallic silver	1 ounce.

No. 2.

Nitric acid, C. P	5 ounces.
Water, distilled	5 "
Quicksilver	1 ounce.

The two solutions are made in separate vessels, and then mixed and kept in a glass-stoppered bottle. This mordant can be diluted with water, and thus the intensity of its action can be regulated. A strip of zinc, bent so as to touch a bared portion of the steel at one end and the Spencer acid at the other, is used to establish a galvanic action and start the action of the acid.

ARTOTYPE FORMULAS.

Coat clean glass with

Albumen	150	grams.
Potassium bichromate	3	"

Dry in oven at 110° F. Lay face down on black velvet, and expose to light until albumen is insoluble. Coat with following:

Gelatine, soft	160	grams.
Ammonium bichromate	30	"
Water	2400	c. c.

Dry again at 110° F., and coat with:

A.

Gelatine	75	grams.
Water	1000	c. c.

B.

Isinglass	75	grams.
Ammonium bichromate	18	"
Water	1000	c. c.

C.

Chrome alum	10	grams.
Potassium bicarbonate	2	"
Water	2000	c. c.

Mix A and B, and to each 100 c. c. add 2 c. c. of C. Flow and dry the plate as before. Expose in shade under negative for ten minutes. Immerse in water until colorless, wipe off with sponge, and print in a lithographic press.

A Substitute for Asphaltum.

Gum turmeric has been suggested as a substitute for asphaltum, the following being the formula:

Chinese turmeric	10	parts.
Alcohol	100	"
Oil of lavender	5	"
Methyl violet, saturated solution in alcohol	2	"

CARBUTT'S DEVELOPER FOR PROCESS PLATES.

Developing Formula for Half-Tone (Screen) and Negatives of Pen Drawings.

No. 1.

Neutral oxalate of potash	1	pound.
Warm water (free from lime salts)	48	ounces.

Add of a strong solution of citric acid enough to just turn litmus paper red.

No. 2.

Sulphate of iron	½ pound.
Sulphuric acid	15 drops.
Warm water	24 ounces.

No. 3.—*Restrainer.*

Potassium bromide	½ ounce.
Water	10 ounces.

To develop, to 5 ounces No. 1 add 1 ounce No. 2 and 10 drops No. 3.

To get an evenly developed plate, use sufficient developer to well cover the plate, allow to act until, on looking through, the image appears quite dense; then wash and place in clearing bath one or two minutes.

No. 4.—*Clearing Bath.*

Alum	1 ounce.
Citric acid	½ "
Water	20 ounces.

Again wash and immerse in fixing bath.

No. 5.—*Fixing Bath.*

Sulphite of soda	2 ounces.
Water	6 "
Sulphuric acid	1 dram.
Water	2 ounces
Hyposulphite of soda	1 pound.
Water	48 ounces.
Chrome alum	1 ounce.
Water	8 ounces.

Dissolve in the order given, add the solution of sulphuric acid to the sulphite of soda, add this to the hyposulphite, and finally add the solution of chrome alum.

No. 6.—*Reducing Solution.*

Ferricyanide of potassium	50 grains.
Water	10 ounces.

No. 7.—*Bleaching Solution.*

A.

Bichloride of mercury	240 grains.
Chloride of ammonium	240 "
Distilled water	20 ounces.

No. 7.—*Sulphite of Soda Solution.*

B.

Sulphite of soda	1 ounce.
Water	9 ounces.

Line Drawings from Photographs.

Sensitize Clemon's matt salted paper with a 40-grain-to-the-ounce bath of silver nitrate. Print under negative, and fix in hypo bath, 1 : 6. Wash well, mount, and draw on the print with waterproof India ink. Bleach out the photographic image with

Bichloride of mercury	1 ounce.
Water	5 ounces.

To Clean Glass.

Make up the following mixture:

Powdered pumice-stone	1 ounce.
Powdered chalk	1½ ounces.
Ammonia	½ ounce.
Water	1 "

Apply with a piece of wash leather, and polish with a piece of rag or soft paper.

Lemercier Lithographic Drawing-Ink.

Yellow wax	4 parts.
Tallow (mutton)	4 "
Marseilles soap	12 "
Shellac	6 "
Lampblack	1 part.

Boil together. Grind, when cold, with water. It should flow like writing-ink from the pen.

Lead Intensifier for Line Negatives.

After developing and washing, place the negative in a tray containing:

Red prussiate of potash	2 ounces.
Nitrate of lead	1¼ "
Water	24 "

Allow to remain until the film turns white, remove, and wash five minutes in running water, and blacken with:

Ammonium sulphuret	1 ounce.
Water	4 ounces.

Allow to act until it has penetrated the film, which is determined by examining back of plate; wash and clear with:

Nitric acid	1 dram.
Water	4 ounces.

Gelatine Solution for Stripping Film.

Sheet gelatine	1 ounce.
Glycerine	¼ "
Water	9 ounces.

Made in quantities to suit convenience.

Soak gelatine half an hour, and melt at a temperature of 110°; strain through double thickness of cheese-cloth. The negative to

be coated must be placed on a three-point leveling stand; an extemporaneous one can be made by inserting in a bench or table three long screw-eyes, so placed as to form a triangle, placing a glass on them, and, by the aid of a small spirit-level, bring the surface to a true level.

PYRO DEVELOPER FOR STRIPPING PLATES.

CARBUTT'S.

No. 1.—*Pyro Stock Solution.*

Distilled ice water	10 ounces,	or 300 c. c.
Oxalic acid	1 dram,	" 4 "

Then add Schering's or Merck's Pyro, 1 ounce, or 30 grams, and water to make 16 fluid ounces, or 480 c. c.

No. 2.—*Soda Stock Solution.*

Soda sulphite, crystals	4 ounces,	or 120 grams.
Soda carb., crys. (or dry gran., 1 ounce)	2 "	" 60 "
Potash carbonate	1 ounce,	" 30 "
Water	10 ounces,	" 300 c. c.

Dissolve, and add water to make measure 16 fluid ounces, or 480 c. c.

No. 3.—*Bromide Solution.*

Bromide of sodium or potassium	½ ounce,	or 14 grams.
Water	5 ounces,	" 150 c. c.

To Develop.

Dilute 2 parts of stock No. 2 with 7 parts of water for cold weather, and 10 to 12 of water in summer. To three ounces of dilute No. 2 add 1½ to 2½ drams, or 6 to 10 c. c., of No. 1. The more pyro the denser the negative, and *vice versa.* No yellowing or fogging need be apprehended if directions are followed. Development should be continued until the image seems almost buried, then wash, and place in fixing bath.

N. B.—A few drops of bromide, say 8 to 12 drops, to the above is recommended.

For *instantaneous exposure,* take for a 5 x 8 or 6½ x8½ plate three ounces of dilute No. 2. Lay the plate to soak in this, and cover pan. Put 2 drams of No. 1 into the graduate, and 2 drops of bromide solution. Pour the soda solution off of the plate into the pyro and back over the plate; let development proceed, and examine occasionally. Keep solution in gentle motion over the plate. A *very* short exposure may take ten minutes to fully develop. If the image is not fully brought out this time, add to developer in pan three times its bulk of water, and let plate lie in it covered over half an hour or more if necessary, until full development is attained, then wash, and proceed as directed under head of developer.

Amateur Photographic Societies

UNITED STATES

AGASSIZ ASSOCIATION, MANHATTAN CHAPTER.—Established 1881. Headquarters, 141 East 40th Street, New York City. Annual meeting, in January. *President,* Rudolph P. Miller; *Vice-President,* Miss K. Hargrove; *Secretary,* Christian F. Groth; *Treasurer,* W. S. Miller.

AKRON CAMERA CLUB, AKRON, OHIO.—Established November, 1890. Headquarters, corner Mill Street and Broadway. Meetings, second and last Tuesdays of each month. *President,* Prof. C. M. Knight; *Vice-President,* Dr. J. L. Lee; *Secretary,* Jno. W. Schuler; *Treasurer,* E. J. Hoskin.

ALBANY CAMERA CLUB, THE, ALBANY, N. Y.—Organized October 21, 1887—Incorporated 1891. Headquarters Club House, 29 Steuben Street. Annual meeting, first Friday in April. *President,* R. S. Oliver; *Vice-President,* Chas. W. Reynolds; *Secretary,* Chas. L. Palmer; *Treasurer,* T. L. Carroll.

ALAMEDA (CAL.) CAMERA CLUB.—Established October 22, 1897. Headquarters, Lafayette Hall. Annual meeting, first Tuesday in the year. *President,* Mrs. Mary Dickson; *Vice-President,* Mr. W. Y. Gill; *Secretary and Treasurer,* Mrs. M. E. Chase.

ALTOONA CAMERA CLUB.—Organized, November, 1900. Headquarters, Altoona, Pa. *President,* T. R. Browne; *Vice-Presidents,* A. W. Gibbs, C. L. Miller; *Secretary,* W. J. Hamor; *Treasurer,* J. W. Trummer.

AMERICAN INSTITUTE PHOTOGRAPHICAL SECTION, NEW YORK CITY.—Established 1859. Headquarters, 19 and 21 West 44th Street. Annual meeting, first Thursday in February. *President,* Oscar G. Mason; *Vice-President,* Robert A. B. Dayton; *Secretary,* J. W. Bartlett, M.D., F.R.P.S.; *Treasurer,* James Y. Watkins.

AMERICAN LANTERN SLIDE INTERCHANGE.—Established 1885. Headquarters, 361 Broadway, N. Y. Annual meeting, November 15 of each year. *General Manager,* F. C. Beach. *Board of Managers,* F. C. Beach, W. H. Cheney, Orange, N. J.; John P. Zenner, Buffalo, N. Y.; Herbert F. Smith, Syracuse, N. Y.; W. H. Rau, Philadelphia, Pa.

ATHENS CAMERA CLUB, ATHENS, PA.—Organized May, 1901. *President,* Irving K. Park; *Vice-President,* Geo. F. Sheers; *Secretary,* John T. Sanford; *Treasurer,* Ansel Newman.

BALTIMORE CAMERA CLUB OF THE WEST BRANCH Y. M. C. A. —Established 1899. Headquarters, Baltimore, Md. *President,* Bryan Nicholson; *Vice-President,* Wm. N. Hazen; *Secretary and Treasurer,* Chas. E. Adams.

BALTIMORE (MD.), THE PHOTOGRAPHIC CLUB OF.—Reorganized May 18, 1891. Headquarters, 870 Linden Avenue. Annual meeting, first Tuesday in April. Regular meetings, every Tuesday. *President,* Frank Slothower, M.D.; *Vice-President,* Percy M. Reese; *Secretary,* James F. Ferguson; *Treasurer,* E. M. Barker.

BANGOR CAMERA CLUB, BANGOR, MAINE.—*President,* Ora W. Knight; *Vice-President,* D. B. Jones. *Directors,* Ora W. Knight, F. L. Sekenger, J. W. Judkins, A. S. Allen, Dr. W. F. Johnson.

BAYSHORE (L. I.), THE CAMERA CLUB OF.—Organized 1900. *President,* Charles W. Mulford; *Vice-Presidents,* Miss Dora Young and Miss Effie Schenck; *Secretary,* Howard Rowe; *Treasurer,* Howard Glutzbeck.

BINGHAMTON Y. M. C. A. CAMERA CLUB.—Established 1899. Headquarters, Binghamton, N. Y. *President,* Albert B. Brown; *Vice-President,* Arthur B. Hollister; *Secretary,* H. C. Price; *Treasurer,* E. F. Robinson.

BIRCHWOOD-BEACH CAMERA CLUB, HARBERT, MICH.—Established, 1890. Annual meeting, May 1. *Secretary,* W. B. Sizer.

BOSTON CAMERA CLUB.—Established 1881. Headquarters, 50 Bromfield Street, Boston, Mass. Annual meeting first Monday in January. *President,* William R. Richards; *Vice-Presidents,* Francis H. Manning, Chas. H. Currier, Frederick S. Anable; *Secretary,* Chas. Hall Perry; *Treasurer,* Charles H. Chandler.

BRIDGETON CAMERA SOCIETY, BRIDGETON, N. J.—Established February, 1899. Headquarters, 46 and 48 East Commerce Street. Annual meeting, first Tuesday in February. *President,* Fred F. Smith; *Vice-President,* Sidney H. Ogden; *Secretary,* Chas. C. Woodruff; *Treasurer,* Hugh L. Reeves.

BRISTOL CAMERA CLUB.—Established January, 1899. Headquarters, Bristol, Pa. *President,* Llewelyn Davis; *Vice-President,* Jesse O. Thomas, Jr.; *Secretary,* Edgar A. Smith; *Treasurer,* Philip J. Blackwood.

BROCKTON CAMERA CLUB, BROCKTON, MASS.—Established April 9, 1894. Headquarters, Arcade Building. Annual meeting, third Friday in April. *President,* W. Fred Allen; *First Vice-President,* E. C. Fisher; *Second Vice-President,* Fred L. Packard; *Secretary,* Geo. E. Bolling; *Treasurer,* W. C. Spring.

BROOKLYN ACADEMY OF PHOTOGRAPHY.—Established February, 1887. Headquarters, 177 Montague Street, Brooklyn. Annual meeting, first Tuesday in June. *President,* Dr. S. B. Price; *First Vice-President,* A. N. Cook; *Second Vice-President,* Wm. Bogert Walker; *Secretary,* H. E. Hayes; *Treasurer,* A. S. Ingram.

BROOKLYN CAMERA CLUB, BROOKLYN, N. Y.—Established 1897. Headquarters, 776 Manhattan Avenue. Monthly meeting, first Wednesday. *President,* Henry B. Smith; *Vice-President,* David C. Holton, M.D.; *Secretary,* George B. Smith; *Treasurer,* Wm. H. Davis.

BROOKLYN INSTITUTE OF ARTS AND SCIENCES, DEPARTMENT OF PHOTOGRAPHY OF THE.—Headquarters, 201 Montague Street, Brooklyn, N. Y. Annual meeting, second Friday in April. *President,* Prof. William C. Peckham; *First Vice-President,* Wm. A. Boger; *Second Vice-President,* James H. Fergusson; *Secretary,* Henry C. Knight; *Treasurer,* William B. Colson.

BROOKLYN (N. Y.), THE CAMERA CLUB OF THE POLYTECHNIC INSTITUTE.—Organized October, 1899. *President,* Henry D. Scribner; *Vice-President,* H. Schieren; *Secretary and Treasurer,* Willis D. Chandler.

BUFFALO (N. Y.) CAMERA CLUB.—Established 1888. Annual meeting, last Tuesday in September. *President,* J. A. Stein; *Vice-President,* Harlow H. Boyer; *Secretary and Treasurer,* C. L. Baer.

CALIFORNIA CAMERA CLUB.—Incorporated March 18, 1890. Headquarters, Academy of Sciences Building, San Francisco. Annual meeting, first Tuesday after first Monday in April. *President,* J. W. Erwin; *First Vice-President,* W. B. Webster; *Secretary,* W. E. Palmer; *Treasurer,* E. G. Eisen, D.D.S.

CAMERA CLUB, NEW YORK, N. Y. Established 1896. Headquarters, 3 West 29th Street. *President,* John Aspinwall; *Vice-President,* J. Edgar Bull; *Secretary,* D. J. Dowdney; *Treasurer,* W. E. Wilmerding.

"CAMERADS," NEW BRUNSWICK, N. J.—*Secretary,* Harvey Iredell, D.D.S.; *Treasurer,* Chas. V. Myers.

CAPITAL CAMERA CLUB OF WASHINGTON, D. C.—Organized May, 1891. Headquarters, 1010 F Street, N. W., Walter Building. Annual meeting, first Saturday in May. *President,* Dr. W. P. Herbst; *Vice-President,* H. P. Simpson; *Secretary,* W. F. Peabody; *Treasurer,* W. S. Davenport.

CENTRAL CAMERA CLUB OF THE YOUNG MEN'S CHRISTIAN ASSOCIATION, BROOKLYN, N. Y.—Established January, 1889. Headquarters, 502 Fulton Street, Brooklyn, N. Y. Annual meeting, first Monday in January. *President,* Wm. H. Lowery; *Vice-President,* Frederick Fricke; *Secretary,* Adolph H. Grosser; *Treasurer,* Jno. L. Fredlund.

CHATTANOOGA CAMERA CLUB.—Established December 12th. 1898. Headquarters, Chattanooga, Tenn. *President,* M. L. Mudge; *Secretary and Treasurer,* Emil B. Igou.

CHAUTAUQUA PHOTOGRAPHIC EXCHANGE CLUB.—Established 1888. (Correspondence.) *President,* C. M. Fitzgerald, of California; *Secretary and Treasurer,* Mrs. C. L. Pierce, "Elmhurst," Riverside, Conn.

CHICAGO SOCIETY OF AMATEUR PHOTOGRAPHERS.—Established 1886. Incorporated September 19, 1895. Headquarters, The Art Institute. Annual meeting, fourth Wednesday in January. *President,* Wm. P. Gunthorp; *Vice-President,* Marshall Wait; *Secretary,* E. W. Thomas; *Treasurer,* Herman C. Knoke.

COLORADO CAMERA CLUB, THE, DENVER, COLO. Established October 26, 1891. Headquarters, 329 16th Street. Annual meeting, third Saturday in December. *President,* Capt. H. D. Smith; *Vice-President and Secretary,* George L. Beam; *Treasurer,* George A. Green.

THE CRITICAL SHOT
IN GOLF

TOM BENLOW APPROACHING

Negatives by G. C. Dodd

COLUMBIA PHOTOGRAPHIC SOCIETY.—Established December 7, 1889. Headquarters, 1811 North Broad Street, Philadelphia, Pa. Annual meeting, first Monday in February. *President,* G. J. R. Miller, D.D.S.; *First Vice-President,* Percival A. Mitchell; *Second Vice-President,* Frank E. Gartley; *Secretary,* John N. Reeve; *Treasurer,* John S. Newman.

COLUMBIAN AMATEUR PHOTO EXCHANGE.—Established 1893 *President,* A. H. Waite; *Secretary,* W. E. Dickinson, Osage, Iowa.

CORLISS ART AND CAMERA CLUB.—Established 1896. Headquarters, corner State and Harris Streets, Newburyport, Mass. Annual meeting, first Friday in April. *President,* F. B. Hubbard; *Vice-President,* Miss Adelaide Pritchard; *Secretary,* Frank Patton; *Corresponding Secretary,* John T. Lunt; *Treasurer,* Edgar F. Noyes.

CORYDON CAMERA CLUB.—Established 1899. Headquarters, Corydon, Ind. *Captain,* Hugh O'Connor; *Vice-Captain,* S. D. Bartley; *Secretary,* Miss Clem Mathes; *Treasurer,* John Trotter.

DAGUERRE CAMERA CLUB, NEW YORK, N. Y.—Established 1895. Headquarters, members' houses. Annual meeting, second Wednesday in May. *President,* Chas. A. Rice; *Vice-President,* A. D. Fell; *Secretary,* H. J. Smith; *Treasurer,* Charles A. Rice.

DENVER (COL.), Y. M. C. A. CAMERA CLUB.—Established December, 1899. Headquarters, Y. M. C. A. Annual meeting, December 1st. *President,* C. Clayton; *Vice-President,* J. W. Larimore; *Secretary and Treasurer,* V. S. Pink.

DETROIT CAMERA CLUB.—Established February 11, 1897. Headquarters, Van Husan Building, 106 Miami Avenue. Annual meeting, first Tuesday in June. *President,* E. Donald Roberts; *Vice-President,* E. W. Sprague; *Secretary-Treasurer,* W. E. Winckler.

DULUTH Y. M. C. A. CAMERA CLUB.—Established June, 1898. Headquarters, Y. M. C. A., Duluth, Minn. Address, B. A. Shuman, Secretary Y. M. C. A.

EAST END CAMERA CLUB, CLEVELAND, OHIO.—Established April 3, 1900. Headquarters, 1259 Cedar Avenue. Annual meeting, April. *President,* Ellsworth Sanderson; *Vice-President,* George Galloway; *Secretary,* A. L. Smith; *Treasurer,* W. T. Provo.

EAST ORANGE CAMERA CLUB.—Established January 1, 1898. Headquarters, East Orange, N. J. Annual meeting, second Monday in January. *President,* G. W. Joy; *Vice-President,* W. L. Booth; *Secretary,* F. A. Watt, Jr.; *Treasurer,* C. H. Failes.

ELIZABETH CAMERA CLUB.—Established May, 1893. Headquarters, 96 Broad Street. Annual meeting, first Saturday in May. *President,* H. O. Halsey; *Vice-President,* W. C. Wells; *Secretary,* J. H. Walker; *Treasurer,* W. R. Bird.

ELMIRA (N. Y.) Y. M. C. A. CAMERA CLUB.—Organized May, 1901. *President,* H. B. Mitchell; *Vice-President,* G. C. Gerity; *Secretary and Treasurer,* R. E. Doane.

ERIE CAMERA CLUB, ERIE, PA.—Established, May 29, 1894. Headquarters, Room 30, Dowing Building. Annual meeting, second Tuesday of January. *President,* Ottomar Jarecki; *Vice-President,* Frank W. Grant; *Secretary,* B. P. Beckers; *Treasurer,* Robert W. Smith.

FOSTORIA (OHIO) CAMERA CLUB, FOSTORIA BICYCLE CLUB.—Established 1895. Headquarters, First National Bank Bldg. Annual meeting, September. *President,* A. E. Mergenthaler; *Vice-President,* W. B. Ward; *Secretary and Treasurer,* Andrew Emerine, Jr.

FRANKFORD CAMERA CLUB.—Headquarters, Frankford, Philadelphia, Pa. *President,* Prof. John W. Moyer; *Vice-President,* William R. Miller; *Secretary,* John M. Justice; *Treasurer,* Alexander Christian.

GENESEE CAMERA CLUB.—Established 1899. Headquarters, Genesee, N. Y. *President,* W. E. B. De Vine; *Secretary,* Owen Scott; *Treasurer,* B. Howarth.

GREENVILLE (N. J.) CAMERA CLUB.—Established January, 1899. Headquarters, Armbruster's Greenville Schuetzen Park, Jersey City, N. J. Annual meeting, first Sunday in January. *President,* William H. Robidoux; *Vice-President,* C. H. Chavant; *Secretary,* Adolph A. Langer, 116 Danforth Avenue, Jersey City, N. J.; *Treasurer,* William Armbruster.

HARTFORD SCIENTIFIC SOCIETY.—Established and incorporated 1885. Headquarters, Hartford, Conn. Annual meeting, first Tuesday in October. *President,* Col. H. S. Redfield. PHOTOGRAPHIC SECTION.—*Chairman,* Dr. G. L. Parmele; *Secretary,* Miss Harriet M. Olmsted; *Treasurer,* Miss Emma L. Williams.

HAVERHILL (MASS.) CAMERA CLUB.—Established February 8, 1898. Headquarters, Rooms 44 and 45, Daggett Building. Annual meeting, second Tuesday of June. *President,* H. S. Baxter; *Vice-President,* Linwood O. Towne; *Secretary and Treasurer,* Alfred E. Collins.

ILLINOIS COLLEGE OF PHOTOGRAPHY, EFFINGHAM, ILL.—Established 1894. *President,* L. H. Bissell; *Secretary,* J. A. Rinehart; *Treasurer,* Dr. Henry Eversman.

INTERNATIONAL PHOTO PRINT EXCHANGE.—Established May, 1893. Headquarters, Beach Bluff, Mass. A postal photographic exchange club limited to twenty members. *Secretary and Treasurer,* Walter Sprange.

JAMAICA (N. Y.) AMATEUR PHOTOGRAPHERS' ASSOCIATION.—Organized July 2, 1901. Headquarters, Bernhard Court. *President,* J. Browne, Jr.; *Secretary,* Dexter H. Walker; *Treasurer,* Dr. Herbert Noble.

JERSEY CITY CAMERA CLUB.—Established November 16, 1899. Headquarters, 108 Monticello Avenue, Jersey City. Annual meeting, first Monday in December. *President,* E. P. Waggoner; *Vice-President,* Jonathan Bartley; *Secretary,* Thomas H. Hall; *Treasurer,* Harry Lowderbough.

JERSEY CITY Y. M. C. A. CAMERA CLUB.—Established 1899. Headquarters, Jersey City, N. J. *President,* J. Mills Dilloway; *Secretary,* R. Anderson.

LANCASTER (PA.) CAMERA CLUB.—Established May 15, 1895. Headquarters, Morning News Building, Penn Square. Annual meeting, first Thursday in May. *President,* W. S. Glein; *Vice-President,* W. A. Heitshu; *Secretary and Treasurer,* Chas. A. Sauber; *Corresponding Secretary,* F. A. Demuth.

LANCASTER (PA.) Y. M. C. A. CAMERA CLUB.—Established May 10, 1898. Headquarters, Y. M. C. A. Building. Annual meeting, second Tuesday in April. *President,* John M. Ziegler; *Vice-President,* H. W. Gibson; *Secretary and Treasurer,* John S. Cochran.

LITTLE ROCK CAMERA CLUB.—Established April 1, 1900. Headquarters, 612 Scott Street. Annual meeting, April. *President,* John Leifer; *Vice-President,* Mrs. F. W. Rawles; *Secretary,* John A. Jungkind; *Treasurer,* Miss Myra Thomas.

LOS ANGELES CAMERA CLUB.—Organized December 15, 1899. Incorporated May 18, 1900. Headquarters, Los Angeles, Cal. Annual meeting, second Friday in May. *President,* A. C. Moore; *Vice-President,* W. D. Campbell; *Secretary,* Helen Davie; *Treasurer,* Mrs. P. E. Woten.

LOS ANGELES (CAL.) Y. M. C. A. CAMERA CLUB.—Organized June 5, 1901. *President,* C. A. Stanton; *Vice-President,* P. Eberhart; *Secretary,* R. D. King; *Treasurer,* L. Burdette.

LOWELL CAMERA CLUB, LOWELL, MASS.—Established 1889. Incorporated 1892. Headquarters, Central Block. Annual meeting, first Tuesday in March. *President,* Paul Butler; *Vice-Presidents,* W. P. Atwood, F. T. Walsh; *Secretary,* George A. Nelson, 305 Summer Street; *Treasurer,* A. H. Sanborn.

LOWELL (MASS.) HIGH SCHOOL CAMERA CLUB.—Established October, 1899. Organized May, 1900. Annual meeting, first Wednesday in June. *President,* R. F. Lovejoy; *Vice-President,* Katherine Whitaker; *Secretary and Treasurer,* William Dennett.

MALDEN Y. M. C. A. CAMERA CLUB, MALDEN, MASS.—Established January 16, 1895. Headquarters, Y. M. C. A. Building. Annual meeting, first Wednesday in January of each year. *President,* J. Arthur Came; *Vice-President,* F. G. Stetson; *Secretary,* Ashley M. Hoyt.

MANCHESTER CAMERA CLUB.—Headquarters, Manchester, Mass. Annual meeting, May. *President,* James E. Curran; *Vice-President,* James B. D. Murray; *Secretary,* P. H. Riddle; *Recording Secretary,* Charles L. *Harmon; Treasurer,* F. C. Kellogg.

MANUAL TRAINING HIGH SCHOOL CAMERA CLUB.—Established 1897. Headquarters, Manual Training High School, Brooklyn, N. Y. *President,* Ellis W. Bentley; *Secretary,* John Wray; *Treasurer,* Flora L. Cutting.

MEADVILLE (PA.) CAMERA CLUB.—Established June, 1899. Headquarters, Grayson Block, Meadville, Pa. Annual meeting, first Friday in June. *President,* James M. Bailey; *Vice-Presidents,* Philip Willet, Mrs. J. D. Downing; *Secretary,* A. W. Ellsworth; *Treasurer,* Mrs. A. L. Ballinger.

MERCHANTVILLE PHOTOGRAPHIC SOCIETY, THE.—Established November 4, 1899. Headquarters, Merchantville, N. J. Annual meeting, second Monday in November. *President,* John C. Slater; *First Vice- President,* J. D. Lawrence, M.D.; *Second Vice-President,* E. C. Weston, M.D.; *Secretary,* H. Homer; *Treasurer,* P. R. Young.

METTOWEE AMATEUR PHOTOGRAPHIC CLUB.—Established January, 1899. Headquarters, Granville, N. Y. *President,* F. V. Ives; *Vice-President,* Mrs. Potter; *Secretary,* Daniel Edwards; *Treasurer,* Miss Maddock.

MINNEAPOLIS CAMERA CLUB.—Established 1892. Headquarters, 309 Nicollet Avenue. Annual meeting, second Wednesday in April. *President,* H. E. Murdock; *Vice-President,* F. V. Haven; *Secretary,* C. J. Hibbard, 317 Hennepin Avenue; *Treasurer,* L. J. Skinner.

MOBILE CAMERA CLUB, MOBILE, ALA.—Established March 1, 1898. Headquarters, Art League rooms. Annual meeting, second Friday in January. *President,* Hugh Rolston; *Vice-President,* Chas. S. Shawhan; *Secretary and Treasurer,* Richard Hines, Jr.

MYSTIC CAMERA CLUB, MEDFORD, MASS.—Established June 4, 1889. Headquarters, 2 Ashland Street. Annual meeting, first Tuesday in January. *President,* John F. Wade; *Vice-President,* L. E. Shattuck; *Secretary,* Everett Scammon; *Treasurer,* Chas. A. Clark.

NEWARK CAMERA CLUB, NEWARK, N. J.—Established April 18, 1888. Headquarters, 222 Market Street. Annual meeting, second Monday in April. *President,* Frederick W. Le Porin; *Vice-President,* W. S. Norris; *Secretary,* C. J. Simoni; *Treasurer,* Dr. W. M. Goodwin.

NEW BRITAIN (CONN.) CAMERA CLUB.—Established February 23, 1892. Headquarters, 173 Main Street. Annual meeting, second Tuesday in January. *President,* H. P. Richards; *Vice-President,* A. W. Slipek; *Secretary,* F. B. Woods, 273 Main Street; *Treasurer,* W. H. Horsfall.

NEW HAVEN PHOTOGRAPHIC SOCIETY.—Established 1899. Headquarters, New Haven, Conn. *President,* Dr. W. G. Alling; *Vice-President,* J. R. McCusker; *Secretary,* M. C. Ferguson; *Treasurer,* F. J. Chatterton.

NORFOLK CAMERA CLUB.—Established 1898. Headquarters, Main and Church Streets, Norfolk, Va. *President,* Dr. Randall Barett; *Vice-President,* W. H. Taylor, Jr.; *Secretary,* C. R. Mackimmie; *Treasurer,* H. N. White.

OHIO AMATEURS' ASSOCIATION.—Established November 25, 1898. Headquarters, Fostoria, O. *President,* Clarence H. White; *Vice-President,* E. A. Mergenthaler; *Secretary,* Miss Emma Spencer; *Treasurer,* Andrew Emerine, Jr.

OLD COLONY CAMERA CLUB, ROCKLAND, MASS.—Established 1890. Headquarters, Arnold Building. Annual meeting, first Saturday in January. *President,* David Smith; *Vice-President,* Emery H. Jenkins; *Secretary,* David Smith; *Treasurer,* Emery H. Jenkins.

ONEIDA CAMERA CLUB.—Established March 24, 1894. Headquarters, Post Office Block. Annual meeting, first Tuesday in April. *President*, B. S. Teale; *Vice-President*, E. R. McDougall; *Secretary and Treasurer*, Albert Dygert.

ORANGE CAMERA CLUB, ORANGE, N. J.—Established March 20, 1892. Headquarters, 222 Main Street, Orange, N. J. Annual meeting, March 20. *President*, D. S. Plumb; *Vice-President*, H. R. Terhune; *Secretary*, W. G. Barnes; *Treasurer*, E. S. Butterfield.

OREGON CAMERA CLUB, PORTLAND, OREGON.—Established January 14, 1895. Headquarters, Oregonian Building, Portland, Oregon. Annual meeting, second Tuesday in January. *President*, A. Gavin; *Vice-President*, A. Anderson; *Secretary*, J. W. Holmes; *Treasurer*, C. H. Hoeg.

PAWTUCKET YOUNG MEN'S CHRISTIAN ASSOCIATION CAMERA CLUB.—Established May, 1898. Headquarters, Pawtucket Y. M. C. A. Annual meeting, May each year. *President*, J. Henry Weaver; *Vice-President*, S. H. Byron; *Secretary and Treasurer*, Geo. A. Harrington.

PENDLETON (ORE.) CAMERA CLUB.—Established 1900. Headquarters, Pendleton, Ore. Annual meeting in December. *President*, Lee Moorhouse; *Secretary*, Miss Lucy Bowman; *Treasurer*, H. L. Hasbrouck.

PHILADELPHIA PHOTOGRAPHIC SOCIETY.—Established November, 1862. Headquarters, 10 S. 18th Street. Annual meeting, second Wednesday in April. *President*, S. Hudson Chapman; *Vice-Presidents*, Walter P. Stokes and Samuel Sartain; *Secretary*, Robert S. Redfield; *Treasurer*, William S. Vaux, Jr.

PIKE CAMERA CLUB.—Established 1899. Headquarters, Merrimac, Mass. *President*, Rev. H. A. Cornell; *Vice-President*, Chas. Howe; *Treasurer*, Byron Sargent.

PITTSBURG AMATEUR PHOTOGRAPHERS' SOCIETY.—Established 1885. Headquarters, Carnegie Library. Annual meeting, January, second Monday. *President*, E. E. Keller; *Vice-President*, H. L. Christy; *Secretary*, Joseph H. Hunter; *Treasurer*, W. J. Hunker.

PITTSFIELD CAMERA CLUB, PITTSFIELD, MASS.—Established 1892. Meetings held at residence of members. Annual meeting, February. *President*, J. F. Middleton; *Vice-President*, J. D. Roscoe; *Secretary*, J. E. Colton; *Treasurer*, J. H. Musgrove.

PLAINFIELD CAMERA CLUB, PLAINFIELD, CONN.—Headquarters, Babcock Building. Annual meeting, December. *President*, H. H. Coward; *Vice-President*, Louis Borsum; *Secretary*, J. Hervey Doane, 115 Park Avenue; *Treasurer*, H. W. Marshall.

PLAINFIELD CAMERA CLUB.—Headquarters, Plainfield, N. J. *President*, Harold Serrell; *Vice-President*, J. Hervey Doane; *Secretary*, William L. Murray; *Treasurer*, Harry H. Coward.

PORTAGE CAMERA CLUB.—Established November, 1900. Headquarters, Ravenna, Ohio. *President*, E. E. Myers; *Vice-Presidents*, F. W. Beckberger, J. M. Lowrie, Carrol Brown, Dr. M. G. McBride, Miss Leffingwell.

PORTLAND CAMERA CLUB.—Established May 24, 1899. Headquarters, Portland, Maine. Annual meeting, third Monday in May. *President,* N. W. Edson; *Vice-President,* S. D. Brooks, M.D.; *Secretary,* Charles W. Dearborn; *Treasurer,* J. H. Lamson.

PORTSMOUTH CAMERA CLUB, PORTSMOUTH, VA.—Established 1897. Headquarters, 614 Crawford Street. Annual meeting, June 10. *President,* Jesse P. Neville; *Vice-President,* J. N. Dews; *Secretary and Treasurer,* H. T. Richardson.

POSTAL PHOTOGRAPHIC CLUB.—Organized 1885. Headquarters, 631 Maryland Avenue, S. W., Washington, D. C. *President,* Chas. E. Fairman; *Secretary and Treasurer,* G. A. Brandt.

PROVIDENCE CAMERA CLUB.—Established 1883. Incorporated 1889. Headquarters, 152 Weybosset Street, Providence, R. I. Annual meeting, second Wednesday in June. *President,* Christopher M. Lee; *Vice-President,* W. Penn Mather; *Secretary,* Walter C. Greene; *Treasurer,* Edmund A. Darling.

PROVIDENCE Y. M. C. A. CAMERA CLUB.—Established April, 1896. Headquarters, 519 Westminster Street, Providence, R. I. Annual meeting, April. *President,* C. Abbott Davis; *Secretary,* C. B. F. Davis; *Treasurer,* Heman L. Calder.

READING Y. M. C. A. CAMERA CLUB.—Established 1899. Headquarters, Reading, Pa. *President,* Otis Wanner; *Secretary,* John J. Strickland; *Treasurer,* O. J. Leiby.

RICHMOND CAMERA CLUB, RICHMOND, IND.—Established 1894. Annual meeting, third Wednesday in December. *President,* Prof. R. L. Sackett; *Vice-President,* Prof. W. A. Fiske; *Acting Secretary,* C. W. Haseltine; *Treasurer,* Fred R. Charles.

ROCKLAND CAMERA CLUB OF THE Y. M. C. A.—*President,* Eugene F. Perry; *Vice-President,* Jas. P. Blauvelt; *Secretary and Treasurer,* Herbert R. Marshall.

ROCKVILLE CAMERA CLUB.—Established 1899. Headquarters, Rockville, Conn. *President,* T. S. Pratt; *Vice-President,* E. F. Badmington; *Secretary,* C. F. Gubitz; *Treasurer,* F. H. Holt.

RUTLAND CAMERA CLUB, RUTLAND, VT.—Established October, 1893. Headquarters, 149 S. Main Street. Annual meeting, second Wednesday in October. *President,* Cornele G. Ross; *Secretary and Treasurer,* V. F. Worcester.

SACRAMENTO CAMERA CLUB, SACRAMENTO, CAL.—Established June 4, 1895. Headquarters, 504 J Street. Annual meeting, June 4. *President,* W. E. Cogswell; *Vice-President,* J. J. Gormley; *Secretary,* D. C. Sweeney; *Treasurer,* W. G. Woods.

SALEM (ORE.) CAPITAL CITY PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.—Established March 10, 1900. Headquarters, Salem, Ore. Regular meeting, first and third Monday of each month. *President,* L. C. Van Exxe; *Vice-President,* M. F. McLennan; *Secretary and Treasurer,* H. D. Trover.

SAN DIEGO CAMERA CLUB, SAN DIEGO, CAL.—Established May 12, 1900. Headquarters, Fisher's Opera House Building. Annual meeting. second Tuesday in May. *President,* Ford A. Carpenter; *Vice-President,* J. E. Slocum; *Secretary,* E. L. Rector; *Treasurer,* F. W. Kelsey.

SAVANNAH CAMERA CLUB.—Established June, 1897. Headquarters, Bull Street and Park Avenue. Annual meeting, first Wednesday in May. *President,* Barron Carter; *Vice-President,* H. C. Shuptrine; *Secretary,* Percy Sugden; *Treasurer,* Geo. L. Garmany.

SELMA (ALA.) AMATEUR PHOTOGRAPHIC ASSSOCIATION OF DALLAS CO.—Established December 29, 1887. Headquarters, 915 Broad Street. Annual meeting, first Thursday in January. *President,* William S. Monk; *Vice-President,* S. A. Sexton; *Secretary and Treasurer,* S. Orlando Trippe.

SIOUX CITY (IA.) CAMERA CLUB.—Established 1900. *President,* E. R. Kline; *Vice-President,* Charles R. Olmstead; *Secretary and Treasurer,* D. B. Henderson.

SPRINGFIELD CAMERA CLUB, SPRINGFIELD, MASS.—Established October 11, 1886. Headquarters, Y. M. C. A. Building, State and Dwight Streets. Annual meeting, third Wednesday in October. *President,* Bion D. Wheeler; *Secretary,* E. L. Pease; *Librarian,* F. W. Huntley. Membership, 82

ST. LOUIS PHOTOGRAPHIC SOCIETY.—Established 1892. Headquarters, Century Building (temporary). Annual meeting, first Monday in December. *President,* Robert E. M. Bain; *Vice-President,* John B. Holman; *Secretary and Treasurer,* Charles M. Alexander.

ST. PAUL CAMERA CLUB.—Established April 19, 1899. Headquarters, 48 East Fourth Street, St. Paul, Minn. Annual meeting, second Tuesday of April. *President,* Wm. E. Johnson; *Vice-President,* H. A. Clifford; *Secretary,* Jos. H. Beek; *Treasurer,* F. H. Lloyd.

SUNNY SIDE CAMERA CLUB, ST. LOUIS, MO.—Organized October 10, 1891. Headquarters, third floor of 5900 South Broadway. Annual meeting, October 10. *President,* Berthold W. Blumenthal; *Vice-President,* Edmund Broch; *Secretary and Treasurer,* Wm. Britchner.

SYRACUSE CAMERA CLUB.—Established 1886. Headquarters, University Block. Annual meeting, first Friday after first Monday in January. *President,* Louis S. Morgan; *Vice-President,* J. I. H. Wright; *Secretary,* Dan H. Sweet; *Treasurer,* J. E. Bierhardt.

TACOMA CAMERA CLUB.—Established February or March, 1899. Headquarters, Tacoma, Wash. *President,* Arthur G. Prichard; *Vice-President,* Mrs. M. W. Graff; *Secretary,* Mrs. J. H. Scott; *Treasurer,* Frank G. Taylor.

THE CAMERA CLUB OF NEW YORK.—Incorporated May 7, 1896. Headquarters, 3 West 29th Street. Annual meeting, second Tuesday of April. *President,* Wm. D. Murphy; *Vice-President,* Alfred Stieglitz; *Secretary,* Harry B. Reid; *Treasurer,* Wm. E. Wilmerding. 330 members.

TOLEDO Y. M. C. A. CAMERA CLUB.—Established 1899. Headquarters, Toledo, O. *President,* Wesley Wuerfel; *Vice-President,* W. R. Moffat; *Secretary and Treasurer,* John Powell.

TOPEKA CAMERA CLUB.—Established September 5, 1894. Annual meeting, second Tuesday in January. *President,* F. M. Tuckerman; *Vice-President,* R. H. Gaw; *Secretary,* F. M. Tuckerman; *Treasurer,* W. E. Culver.

TRENTON PHOTOGRAPHIC SOCIETY.—Established January, 1898. Headquarters, Room 11, Scott Building, Trenton, N. J. Annual meeting, first Monday in February. *President,* S. S. Webber; *Vice-President,* Dr. Jas. I. Woolverton; *Secretary,* Grant Castner, 51 Bayard Street; *Treasurer,* William C. Lawrence.

UTICA CAMERA CLUB.—Established February 3, 1899. Headquarters, Utica, N. Y. *President,* D. Vaughn Ely; *Vice-President,* H. H. Wells; *Secretary and Treasurer,* M. C. Brown.

VALLEY CAMERA CLUB.—Established November 18, 1896. Headquarters, Phoenix, R. I. Annual meeting, first Monday in April. *President,* Ward E. Smith; *Secretary,* J. Bancroft Lawton; *Treasurer,* F. J. Hoxie.

WASHINGTON CAMERA CLUB.—Organized 1901. Headquarters, Union Block, Seattle, Wash. *President,* Charles E. Crane; *Vice-President,* H. F. Holmes; *Second Vice-President,* Mrs. Charles Denny; *Secretary,* E. H. Wilder; *Corresponding Secretary,* Miss Appleton; *Treasurer,* J. C. Harris.

WASHINGTON CAMERA CLUB, TACOMA, WASH.—Established May 18, 1900. Headquarters, The Ferry Museum. Annual meeting, first Wednesday in April. *President,* Charles Bedford; *Vice-President,* A. H. Denman; *Secretary,* W. H. Gilstrap; *Treasurer,* J. A. Wintermute.

THE WEBSTER CAMERA CLUB.—Established March, 1898. Headquarters, Webster Groves, Mo. *President,* Frank C. Thompson; *Vice-President,* Walter V. Scholz; *Secretary,* Isaiah Forbes; *Treasurer,* Campbell Dawson.

WHITTENTON CAMERA CLUB, WHITTENTON, MASS. *President,* John Truax; *Vice-President,* William A. Chaplain; *Secretary,* William Bellamy; *Treasurer,* Joseph Smith.

UNITED KINGDOM

AINTREE PHOTOGRAPHIC SOCIETY.—Established 1886. Headquarters, Aintree Institute. Annual meeting, March 31st. *President,* John Harris; *Vice-Presidents,* C. H. Adkins and W. Lockier; *Secretary,* Theodore Wood; *Treasurer,* Thomas Binnie.

ASHTON-UNDER-LYNE PHOTOGRAPHIC SOCIETY.—Established 1891. Headquarters, 10 Henry Square, Ashton-under-Lyne, England. Annual meeting, third Thursday in March. *President,* Dr. Alex. Hamilton; *Vice-Presidents,* Major Bradley, Thos. Glazebrook, Walter Leigh, Abel Buckley, J.P., John W. Kenworthy, J.P., Tulloch Cheyne, Chas. Lord; *Secretary,* Harry Williams; *Treasurer,* Robert T. Marsland.

Engraved by
The Beck Engraving Co.,
Philadelphia, Pa.

By Eddowes Bros.

MADGE WEST

AURORA LANTERN CLUB.—Established 1895. Headquarters, Tunsworth, Blandford, England. *Secretary and Treasurer,* Rev. T. Perkins, M.A., F.R.A.S. Slides circulated four times a year among members and exchange members.

BARROW NATURALISTS' FIELD CLUB. PHOTOGRAPHIC SECTION.—Established 1890. Headquarters, Cambridge Hall, Barrow, England. Annual meeting, March. *President,* J. Redhead; *Vice-President,* R. Bailey; *Secretary,* Wm. J. Angus; *Treasurer,* T. Huddleston.

BATH PHOTOGRAPHIC SOCIETY, ENGLAND.—Established 1888. Headquarters, Royal Literary and Scientific Institution. Annual meeting, February. *President,* Dr. George Norman; *Vice-Presidents,* Col. H. H. Sealy, Surgeon Major Adcock, M.D.; *Secretary and Treasurer,* W. Middleton Ashman, 12a Old Bond Street.

BATLEY AND DISTRICT PHOTOGRAPHIC SOCIETY.—Established 1894. Headquarters, Technical School, Batley, England. Annual meeting, March. *President,* Percy Sheard; *Vice-Presidents,* J. Crabtree, H. B. Buckley; *Secretary,* W. H. Atkinson; *Treasurer,* Dr. Keighley.

BIRMINGHAM NATURAL HISTORY AND PHILOSOPHICAL SOCIETY, BIRMINGHAM, ENGLAND.—Established 1858. Headquarters, Norwich Union Chambers, Congreve Street. Annual meeting, February. *President,* John Levick; *Vice-Presidents,* Prof. T. W. Bridge, M. A., Sc.D., and R. W. Chase, M. B. O. U.; *Secretaries,* W. P. Marshall, M. I. C. E., and W. B. Grove, M.A.; *Treasurer,* C. A. Harrison.

BIRMINGHAM PHOTOGRAPHIC SOCIETY. — Established 1885. Headquarters, Athletic Institute, John Bright Street, Birmingham, England. Annual meeting, first Tuesday in October. *President,* F. T. Middlemore, M.P.; *Vice-Presidents,* Dr. Hall-Edwards, C. J. Fowler, T. W. Robinson, and E. C. Middleton; *Hon. Secretary,* H. Vooght-Cornish; *Treasurer,* Richard Haines, M.A.

BLAIRGOWRIE AND DISTRICT PHOTOGRAPHIC ASSOCIATION.—Established February 13, 1894. Headquarters, George Street, Blairgowrie, Scotland. Annual meeting, third Tuesday in February. *President,* Alex. Geekie; *Vice-Presidents,* J. B. Maclachlan and James Richardson; *Secretary,* Hugh B. Jamieson; *Treasurer,* John Cameron, Jr.

BLAYDON AND DISTRICT CAMERA CLUB.—Established 1900. Headquarters, Cooperative Hall, Blaydon, England. Annual meeting, October 1, 1901. *President,* Arthur Payne, F.C.S.; *Vice-President,* Robert Cubey; *Secretary,* Alex. B. Cunninghame; *Treasurer,* C. Robson.

BOGNOR PHOTOGRAPHIC SOCIETY.—Established March, 1900. Headquarters, Enterprise Rooms, London Road. Annual meeting, first Monday in April. *President,* Dr. F. S. Tidcombe; *Vice-Presidents,* F. Reynolds and C. I. West; *Secretary and Treasurer,* Rev. H. M. Draper.

BOROUGH POLYTECHNIC PHOTOGRAPHIC SOCIETY.—Established 1895. Headquarters, Borough Polytechnic Institute, 103 Borough Road, S. E., London, England. *Chairman,* F. W. Bannister; *Vice-Chairman,* F. W. Gregg; *Secretary,* P. C. Cornford; *Treasurer,* E. G. Hawgood. Annual meeting, September.

BRADFORD PHOTOGRAPHIC SOCIETY.—Established 1894. Headquarters, the Bradford Grammar School. Annual meeting, third Monday in January. *President,* Alex. Keighley, F.R.P.S.; *Vice-Presidents,* A. Bracewell, E. Clough, S. Hampshire, Percy Lund, H. G. Rogerson, G. Thistlethwaite; *Secretary,* Harry Akam, 21 Clarendon Terrace; *Treasurer,* W. C. Ramshaw.

BRECHIN PHOTOGRAPHIC ASSOCIATION. — Established 1888. Headquarters, Y. M. C. A. Institute. Annual meeting, third Wednesday in September. *President,* Wm. Shaw Adamson, Careston Castle; *Vice-Presidents,* R. W. Duke and J. D. Ross; *Secretary,* Alexander Watson, 75 River Street, Brechin, Scotland; *Treasurer,* John E. Small.

BRENTFORD PHOTOGRAPHIC SOCIETY.—Established 1898. Headquarters, Brentford Public Baths, Brentford, England. Annual meeting. first Wednesday in October. *President,* Rev. T. Eland; *Vice-Presidents,* F. A. Turner, A. R. Read, Rev. P. C. West; *Secretary and Treasurer,* Hilton Grundy.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.—Headquarters, Literary and Philosophic Club, Berkeley Square. Annual meeting, January. *President,* H. A. Hood Daniel; *Vice-Presidents,* Edward Bryktman and Dr. Ormerod; *Secretaries,* Edward Bryktman, Lyndale, Redland Road, Bristol, and G. Chilton; *Treasurer,* William Moline.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—Established 1831. Headquarters, office Burlington House, London. Annual meeting, Bradford, 1900. *President,* Sir William Turner, F.R.S.; *Vice-Presidents,* Duke of Devonshire, and others; *Secretary,* G. Griffith; *Treasurer,* Prof. G. C. Foster.

BURY CAMERA CLUB.—Established 1900. Headquarters, The Studio, Fishpool, England. Annual meeting, fourth Tuesday in April. *President,* John Ward; *Vice-President,* E. W. Mellor; *Secretary,* J. Nichols, 36 Nelson Street; *Treasurer,* W. H. Ward.

BURY PHOTOGRAPHIC AND ART CLUB.—Established 1882. Headquarters, 12 Market Street, Bury, England. Annual meeting, fourth Wednesday in September. *President,* Roger Wood, Esq.; *Vice-President,* T. M. Barbour, Esq.; *Secretary,* A. E. Riding; *Treasurer,* J. Nicholls.

CAMBRIDGE Y. M. C. A. CAMERA CLUB.—Established 1896. Headquarters, Alexander Hall, Cambridge, England. Annual meeting, June. *President,* F. W. Bird; *Vice-President and Treasurer,* W. H. Hayles; *Secretary,* A. W. Goatcher.

CAMERA SECTION WORCESTER TRICYCLE CLUB.—Established 1892. Headquarters, Bell Hotel, Worcester, England. Annual meeting, January. *President,* James Wilkes, Esq.; *Secretary,* T. J. Hobson, 15 Albany Terrace, Worcester; *Treasurer,* F. E. Hill.

"CAMERA & CO."—A POSTAL PHOTOGRAPHIC CIRCULATING CLUB.—Established May, 1891. Monthly portfolios. *Hon. Secretary,* Frank H. Read, "Ferndale," 7 Clifden Road, Brentford, Middlesex, England.

CARDIFF PHOTOGRAPHIC SOCIETY.—Established 1886. Headquarters, 7 and 8 Working Street, Cardiff, England. Annual meeting, October 12th. *President,* A. McKinnon; *Vice-Presidents,* S. W. Allen, W. J. Jenkins, D. Williams, J. Dyer Lewis; *Secretary,* J. Blount Hopkins; *Treasurer,* G. P. Nance.

CHICHESTER PHOTOGRAPHIC SOCIETY. — Established 1893. Headquarters, Technical Schools, Chichester, England. Annual meeting, March. *President,* Dr. E. H. Buckell; *Secretary,* G. M. Turnbull; *Treasurer,* J. W. Barnes.

CHISWICK CAMERA CLUB.—Established 1896.—Headquarters, 344 High Road, Chiswick, England. Annual meeting, October. *President,* Herbert Gentry; *Vice-Presidents,* T. A. Coysh, J. Woodger; *Secretary,* W. E. Walker; *Treasurer,* H. E. Ward.

CITY AND GUILDS OF LONDON TECHNICAL COLLEGE FINSBURY PHOTOGRAPHIC SOCIETY.—Established 1887. Headquarters, City and Guilds of London Technical College, Leonard Street, City Road, London, E. C. Annual meeting, October. *President,* R. Meldola, F.R.S., F.I.C., F.C.S.; *Vice-Presidents,* J. Castell Evans, F.I.C. and F. L. Streatfeild, F.I.C.; *Secretaries,* L. A. Williams and J. F. M. Roberts; Treasurer, T. H. Norris, F.I.C.

CLYDESDALE CAMERA CLUB.—Established 1889. Headquarters, Wemyss Bay, Scotland. *President,* H. E. Gordon, Esq.; *Secretary and Treasurer,* Hon. A. Caroline Burns.

COLNE CAMERA CLUB.—Established 1892. Headquarters, Cloth Hall, Colne, Lancaster, England. *President,* Rev. T. Leyland; *Vice-Presidents,* H. Hewitt, J. Duckworth, Jos. Hay, Mayor Foulds, H. Holgate, A. P. Threefall, E. Christian, R. T. Lawson, C. V. Greenwood; *Secretary,* Joshua Robinson; *Treasurer,* E. A. Spevey.

CORNISH CAMERA CLUB. — Established 1888. Headquarters, The Studio, Penzance, Cornwall, England. Annual meeting, October. *President,* W. E. Bailey, F.L.S., C.C.; *Vice-President,* R. Pearce Couch; *Secretary,* H. Tonkin, 22 Market Place, Penzance, Cornwall, England; *Treasurer,* Arthur Pool.

CORNWALL CENTRAL PHOTOGRAPHIC CLUB.—Established October, 1898. Headquarters, Central Technical Schools, Truro, England. Annual meeting, October. *President,* Prof. Clark, M.A., Ph.D.; *Secretary,* Alec. Gregg.

COVENTRY PHOTOGRAPHIC CLUB.—Headquarters, 7 Little Park Street, Coventry, England. Annual meeting, September. *President,* H. D. Waters; *Vice-Presidents,* Messrs. Seymour, Bates, Goodwin, and Riley; *Secretary,* Frank E. Perrson; *Treasurer,* H. D. Waters.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB, PHOTOGRAPHIC SECTION.—Established 1870. Headquarters, Public Hall, George Street, Croydon, Surrey, England. Annual meeting, January 17, 1899. *President,* I. M. Hobson, M.D., B.Sc.; *Vice-President,* W. Murton Holmes; *Secretary,* Harry D. Gower, 55 Benson Road, Croydon, Surrey; *Treasurer,* F. J. Townsend.

DERBY PHOTOGRAPHIC SOCIETY.—Established May, 1884. Headquarters, Town Hall, Derby, England. Annual meeting, second Monday in October. *President,* C. Barrow Keene, F.R.P.S.; *Vice-President,* Geo. Walker; *Secretary,* Harold Frost, 66 Curzon Street; *Treasurer,* F. H. Gandy.

DEVONPORT CAMERA CLUB.—Established 1891. Headquarters, Odd Fellows' Hall, Ker Street, Devonport, England. Annual meeting, September. *President,* R. E. J. Lamb, Esq.; *Vice-Presidents,* Coombes, Dart, Dymond, Turney; *Secretary,* Wm. H. Lamb; *Treasurer,* C. Croydon, Esq.

DORSET AMATEUR PHOTOGRAPHIC ASSOCIATION.—Established 1886. Headquarters, Dorchester, England. *President,* Rev. W. M. Barnes; *Secretary and Treasurer,* Rev. T. Perkins, F.R.A.S., Turnworth, Blandford.

DUKINFIELD PHOTOGRAPHIC SOCIETY.—Established 1888. Headquarters, Cooperative Hall, Astley Street, Dukinfield, England. Annual meeting, January. *President,* Thos. Hodgetts Gordon, M.A., C.C.; *Vice-President,* S. T. Ainsworth; *Secretary,* D. Firth; *Treasurer,* H. L. Hadfield.

"DUNDEE ADVERTISER" PHOTOGRAPHIC CLUB.—Established 1894. Headquarters, Advertiser Office, Dundee, Scotland. Annual meeting, second Tuesday of October. *President,* Mr. J. A. Mackenzie; *Vice-President,* Mr. J. L. Scott; *Secretary and Treasurer,* Archd. Campbell, Stewart Terrace, Barnhill, Broughty Ferry, Scotland.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.—Established 1879. Headquarters, 39 High Street, Dundee, Scotland. Annual meeting, second Thursday of October. *President,* W. F. Hill; *Vice-Presidents,* W. H. Tittensor and W. Salmond; *Secretary and Treasurer,* V. C. Baird, Broughty Ferry, N. B.

DUNEDIN PHOTOGRAPHIC SOCIETY.—Established 1890. Headquarters, Dunedin, Scotland. *President,* C. W. Kerr; *Vice-Presidents,* A. Hamilton and R. A. Ewing; *Secretary,* I. S. Kottowe Webb, care of National Insurance Co., Dunedin; *Recording Secretary,* W. Livingston; *Treasurer,* I. S. Kottowe Webb.

DURHAM CITY CAMERA CLUB.—Established January, 1892. Headquarters, Shakespeare Hall, Durham, England. Annual meeting, February. *President,* Major E. White; *Vice-Presidents,* W. Moult and E. Meynell; *Secretary,* Robert Hauswell; *Treasurer,* Councillor W. Gray, J.P.

Engraved by
Weeks Engraving Co.,
Philadelphia, Pa.

By Geo. P. Hall & Son

EASTBOURNE PHOTOGRAPHIC SOCIETY. — Established 1892. Headquarters, Caldecott Museum Building, Lismore Road, Eastbourne, England. Annual meeting, first week in January. *President,* Henry Habgood, M.D.; *Vice-President,* Major Molineux; *Secretary and Treasurer,* John J. Hollway, Glengariff, Willingdon Road, Eastbourne.

ECCLES PHOTOGRAPHIC SOCIETY.—Established November 29, 1899. Headquarters, 18 Peel Street, Eccles, England. Annual meeting, December. *President,* Henry Williams; *Vice-Presidents,* Edmond Johnson, Herbert Cottrill; *Secretary,* A. Atkinson; *Treasurer,* W. I. Scholes.

EDINBURGH PHOTOGRAPHIC CLUB.—Established 1881. Headquarters, 38 North Castle Street, Edinburgh, Scotland. Annual meeting, October. *President,* H. Scott Lander, M.D., R.N.; *Secretary,* T. Barclay, 180 Dalkeith Road; *Treasurer,* George Cleland.

EDINBURGH PHOTOGRAPHIC SOCIETY.—Established 1861. Headquarters, 38 Castle Street, Edinburgh, Scotland. Annual meeting, first Wednesday in June. *President,* James Burns; *Vice-Presidents,* J. B. Johnston and David McArthy; *Secretary,* J. S. McCulloch, W. S., 10a George Street, Edinburgh; *Treasurer,* Geo. Cleland.

EVERTON CAMERA CLUB.—Established November 1, 1896. Headquarters, Village Street, Everton, Liverpool, England. Annual meeting, December. *President,* I. Hawkins; *Vice-Presidents,* E. Allmey and T. Sanderson; *Secretary and Treasurer,* W. Tansley, Village Street, Everton.

EXETER HALL PHOTOGRAPHIC SOCIETY.—Established May, 1898. Headquarters, Exeter Hall, Strand, London, W. C. Annual meeting, March 18. *President,* Rev. F. C. Lambert, M.A.; *Vice-Presidents,* H. Conder, W. H. Smith, J. H. Putterill, W. Wilson Hind-Smith, F.R.G.S.; *Secretary,* W. E. Longhurst; *Treasurer,* J. H. Butler.

FAKENHAM LITERARY, FIELD, AND CAMERA CLUB.—Established 1892. Reorganized 1900. Headquarters, The Square, Fakenham, England. Annual meeting, third Friday in September. *President,* Algernon Digby, M.A.; *Vice-President,* Rev. A. E. Humphreys, M.A.; *Secretary and Treasurer,* Henry Newson, The Square, Fakenham, Norfolk.

GLASGOW PHOTOGRAPHIC ASSOCIATION.—Established 1862. Headquarters, Glasgow Philosophical Society's Rooms, Glasgow, Scotland. *President,* John Stuart; *Vice-Presidents,* J. Craig Annan and Wm. Lang, F.C.S.; *Secretary,* Chas. Macdonald, 100 W. Regent Street; *Treasurer,* George Bell.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.—Established 1883. Headquarters, 180 West Regent Street, Glasgow, Scotland. Annual meeting, October. *President,* Thos. W. Robertson; *Vice-President,* George Watson, B.A.; *Secretary,* Wm. Goodwin, 3 Lynedoch Street; *Treasurer,* Wm. J. B. Halley.

GLENALMOND PHOTOGRAPHIC CLUB.—Established 1890. Headquarters, Trinity College, Glenalmond, Perthshire, Scotland. Annual meeting, October. *President,* Arthur S. Reid, M.A., F.G.S.; *Vice-President,* E. S. Lyttell; *Secretary,* K. Barge; *Treasurer,* J. C. Henderson-Hamilton.

GLOSSOP DALE PHOTOGRAPHIC SOCIETY, GLOSSOP.—Re-established 1883. *President,* E. Partington, Esq., J.P.; *Vice-Presidents,* S. H. Wood, Esq., Col. W. Sidebottom, M.P.; *Secretary,* T. W. Sharpe, 1 Pikes Lane, Glossop; *Treasurer,* J. Hardman, Norfolk Square, Glossop, England.

GLOUCESTERSHIRE PHOTOGRAPHIC SOCIETY.—Established 1883. Reconstructed 1887. Headquarters, Schools of Science and Art, Gloucester, England. Annual meeting, January. *President,* Dr. Campbell; *Vice-President,* George Whitcomb, *Secretary,* E. A. Ind, 36 Northgate Street; *Treasurer,* John Tibbitts.

GOLDSMITHS' INSTITUTE CAMERA CLUB.—Established 1893. Headquarters, Goldsmiths' Institute, New Cross, London, S. E., England. Annual meeting, September. *President,* J. W. Penfold; *Vice-Presidents,* W. J. Pope, W. G. Hodge, W. T. Wilkinson; *Secretaries,* C. B. Storey and A. H. Downey; *Treasurer,* W. Jacob.

GOSPEL OAK PHOTOGRAPHIC SOCIETY.—Established October, 1894. Headquarters, Congregational Schools, Lismore Road, Kentish Town. Annual meeting, March. *President,* Rev. H. Le Pla; *Vice-President,* F. H. Hall; *Secretary,* W. A. Palmer, 13 Dale Road, Kentish Town, N. W.; *Treasurer,* J. E. Rayner.

GRAVESEND AND DISTRICT PHOTOGRAPHIC SOCIETY.—Established 1900. Headquarters, Medical Hall, Gravesend, England. Annual meeting, September. *President,* F. W. Hastings; *Vice-Presidents,* G. M. Arnold, Rev. F. Mort, M.A., Dr. Williams; *Secretary,* Thos. L. Winnett, 5 The Grove, Gravesend; *Treasurer,* A. Gillett.

GUILD, THE.—Established 1900. Headquarters, Leeds, England. Annual meeting, June. *Secretary,* R. Stockdale, 17 Mount Preston, Leeds.

GUILDFORD PHOTOGRAPHIC SOCIETY.—Established 1890. Headquarters, 36 High Street, Guildford, England. Annual meeting, last Tuesday in March. *President,* The Rt. Hon. the Earl of Onslow, G.C.M.G.; *Vice-Presidents,* G. J. Jacobs, J. Russell, R. W. Robinson, G. C. Williamson; *Secretary,* A. E. Moon; *Treasurer,* J. H. Nunn.

HACKNEY PHOTOGRAPHIC SOCIETY, LONDON.—Established May, 1889. Headquarters, The Pembury Tavern, Lower Clapton, England. Annual meeting, March. *President,* A. Horsley Hinton; *Secretary,* Walter Selfe; *Treasurer,* Walter L. Barker.

HAND CAMERA POSTAL CLUB, THE.—Established March 1, 1897. Headquarters, Mount Pleasant House, Leek, Staffordshire, England. *Secretary and Treasurer,* George V. Myatt. The only club devoted exclusively to the circulation and criticism of the work of the most prominent hand camera workers in the United Kingdom. Only workers of proficiency and known merit are eligible for the vacancies which occasionally occur.

HANDSWORTH PHOTOGRAPHIC SOCIETY.—Established December 10, 1894. Headquarters, College House, Hamstead Road, Handsworth, Staffordshire, England. Annual meeting, first Thursday in the year. *President,* Philip Whitehouse; *Vice-Presidents,* W. J. Foster, L.R.C.P., E. F. Freeland, W. J. Morgan, C. L. Stait; *Secretary,* A. E. Teague; *Treasurer,* C. F. Jarvis.

HAWKES BAY CAMERA CLUB.—Established April 19, 1895. Headquarters, Regent Street, Napier (clubroom). Annual meeting, October. *President,* Dr. A. Milne-Thomson; *Vice-President,* F. Nelson; *Secretary,* W. Beswick (C.P.O.); *Treasurer,* G. N. Pierce.

HELIOS PHOTOGRAPHIC CLUB.—Established 1887. Headquarters, 55 Locksley Street, Burdett Road, London, E. *Secretary and Treasurer,* Henry Everett, address as above.

HEREFORDSHIRE PHOTOGRAPHIC SOCIETY.—Established 1885. Headquarters, Clarence House, West Street, Hereford, England. Annual meeting, October. *President,* Alfred Watkins; *Vice-President,* J. Parker; *Honorary Secretary,* Cecil Gethers, 9 St. Nicholas Street, Hereford; *Treasurer,* W. E. Haines.

HOLMFIRTH AMATEUR PHOTOGRAPHIC SOCIETY.—Headquarters, Holmfirth, England. Annual meeting, August. *President,* Arthur Preston; *Secretary and Treasurer,* David Bilson, Birchin House, Holmfirth.

HOVE CAMERA CLUB.—Established 1891. Headquarters, Town Hall, Hove, England. Annual meeting, April. President, J. J. Colman, Mayor of Hove; *Vice-Presidents,* W. A. Hounsom, Chas. Job, E. E. Mainwaring, W. C. Wallis, G. B. Woodruff; *Secretary,* A. R. Sargeant, 55 The Drive, Hove; *Treasurer,* R. C. Foskett.

HUDDERSFIELD NATURALIST AND PHOTOGRAPHIC SOCIETY. Established 1850. Headquarters, Y. M. C. A., King Street. Annual meeting, December 15th. *President,* Alfred Clarke; *Vice-Presidents,* H. G. Brierley and T. W. Woodhead, F.L.S.; *Secretary,* L. Leonard; *Treasurer,* A. W. Whiteley.

HULL PHOTOGRAPHIC SOCIETY.—Established 1884. Headquarters, 71 Prospect Street, Hull, England. Annual meeting, April. *President,* F. Atkinson; *Vice-Presidents,* J. Hollingworth, M.R.C.S., R. E. Johnson; *Secretary,* J. W. Atkinson; *Treasurer,* J. T. Scott.

THE IDLERS' CAMERA CLUB.—Established 1898. Headquarters, 52 Belmont Road, Bristol, England. Annual meeting, November. *President,* Charles Harry; *Secretary and Treasurer,* Arthur F. Vizor Collett.

IPSWICH SCIENTIFIC SOCIETY, PHOTOGRAPHIC SECTION.—Established 1869. Headquarters, Museum, Ipswich, England. Annual meeting, January. *President,* W. E. Watkins; *Secretary,* Frank Woolnough.

KEIGHLEY AND DISTRICT PHOTOGRAPHIC ASSOCIATION.—Established January, 1889. Headquarters, Mechanics' Institute, Keighley, England. Annual meeting, September. *President,* Thomas Heaps; *Vice-President,* Samuel Blairstow; *Secretaries,* C. H. Smith, 110 Devonshire Street, Frank Gill, Highfield Lane; *Treasurer,* Walter Mitchell.

KING WILLIAMS TOWN ART AND CAMERA CLUB.—Established 1898. Headquarters, King Williams Town. Annual meeting, September. *President,* T. N. Dyer, Esq. (Mayor); *Chairman,* Dr. Chute; *Secretary,* Dr. H. A. Spencer, Maclean Street; *Treasurer,* A. G. Doble, Esq., Maclean Street.

LANCASTER PHOTOGRAPHIC SOCIETY.—Established 1889. Headquarters, Stonewell (Lancaster), England. Annual meeting, last Tuesday in March. *President,* Alan Garnett, Esq.; *Vice-Presidents,* N. Holden and A. S. Barling; *Secretary,* W. Briggs; *Assistant Secretary and Librarian,* R. T. Simpson; *Treasurer,* J. T. Miller.

THE LEAMINGTON AMATEUR PHOTOGRAPHIC SOCIETY.—Established June, 1887. Headquarters, Pump Room, Leamington. Annual meeting, October. *President,* The Rev. Ed. Healy; *Secretary,* Signor Aspa, Priory House, Leamington; *Treasurer,* B. McGrath, Esq., 39 Clarendon Square, Leamington.

LEEDS CAMERA CLUB.—Established September, 1893. Headquarters, White Swan Hotel, Call Lane, Leeds. Annual meeting, last Wednesday in December. *President,* F. Rust; *Vice-Presidents,* Major Norwood, A. Homburg, W. Emmott, W. R. Irwin; *Secretary,* F. G. Issott; *Treasurer,* J. Skilbeck.

LEEDS PHOTOGRAPHIC SOCIETY.—Established 1852. Headquarters, Philosophical Hall. Annual meeting, December. *President,* Godfrey Bingley; *Vice-Presidents,* B. A. Barrell, F.I.C., and R. Stockdale, M.A.; *Secretary,* J. C. Coultas, Chapel Lane, Headingly; *Treasurer,* Thos. Carter, Leeds, England.

LEITH AMATEUR PHOTOGRAPHIC ASSOCIATION.—Established 1888. Headquarters, 16 Primrose Street, Leith, Scotland. Annual meeting, last Tuesday in September. *President,* Thomas Wilson; *Vice-President,* Wm. Seatter; *Secretary,* Wm. Duncan, 36 Charlotte Street; *Treasurer,* Murdock Campbell.

LEWES PHOTOGRAPHIC SOCIETY.—Established 1888. Headquarters, Municipal Buildings. Annual meeting, September. *President,* S. I. Wightman, Esq.; *Vice-President,* J. Tunks, Esq.; *Secretary and Treasurer,* Geo. Carpenter, 81 High Street, Lewes, England.

LIGHT AND TRUTH PHOTOGRAPHIC CLUB.—Established 1890. *Secretary,* Geo. Harry Haycox, St. Dunstan's Crescent, Worcester, England.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—Established 1863. Headquarters, Percy Buildings, Eberle Street, Liverpool, England. Annual meeting, third Thursday in January. *President,* Dr. Llewellyn Morgan; *Vice-Presidents,* E. Rimbault Dibdin and Joseph Appleby; *Secretary,* Edwin Simnett; *Treasurer,* P. H. Phillips.

LIVERPOOL CENTRAL Y. M. C. A. CAMERA CLUB.—Established 1888. Headquarters, Cent. Y. M. C. A., Mount Pleasant, Liverpool, England. Annual meeting, second Wednesday in April. *President,* Richard Brown; *Secretary and Treasurer,* G. B. G. Cherkezian.

LONDON AND PROVINCIAL PHOTO ASSOCIATION.—Established 1882. Headquarters, White Swan Hotel, Tudor Street, London, E. C., England. Annual meeting, June. *Secretary and Treasurer,* Walter D. Welford, 166 Romford Road.

Engraved by
Gill Engraving Co.,
New York

By Howard Rush

A BROOK.

LONGTON AND DISTRICT PHOTOGRAPHIC SOCIETY.—Established 1894. Headquarters, Sutherland Institute, Longton, Staffordshire, England. Annual meeting, first Thursday in March. *President,* A. Parkes, M.R.C.S., L.R.C.P.; *Vice-Presidents,* E. Hallam, A. W. Allin; *Secretary,* Thos. Mottershead; *Treasurer,* S. Ashcroft.

LOUGHBOROUGH PHOTOGRAPHIC SOCIETY.—Established 1888. Headquarters, Devonshire Square, Loughborough, England. Annual meeting, second Friday in March. *President,* W. C. Burder, Esq.; *Secretaries,* W. Clarke, P. W. Crane.

LYONSDOWN AMATEUR PHOTOGRAPHIC ASSOCIATION, THE.—Established June 24, 1896. Headquarters, members' houses. *Secretary,* Frank J. Martin, Northdene, New Barnet, England; *Treasurer,* Walter Crosbie.

MANCHESTER AMATEUR PHOTOGRAPHIC SOCIETY.—Established 1885. Headquarters, Manchester Athenæum and 15 Brazennose Street, Manchester, England. Annual meeting, last Tuesday in January. *President,* Rev. Henry W. Dick; *Vice-Presidents,* S. L. Coulthurst, J. W. Wade, G. E. Mellor, G. H. B. Wheeler; *Secretary,* J. W. Parrott, 3 Elm Road, Altrincham; *Treasurer,* Chas. Dawson, Esq., 10 Chepstow Street, Manchester.

MANCHESTER PHOTOGRAPHIC SOCIETY, THE. Established 1855. Headquarters, 44 Mosley Street, Manchester, England. Annual meeting, first Wednesday in October. *President,* Abel Heywood; *Vice-Presidents,* J. Whittaker, W. B. Wood; *Secretary,* C. H. Coote; *Treasurer,* W. G. Coote.

MANCHESTER Y. M. C. A. PHOTOGRAPHIC CLUB.—Established January, 1890. Headquarters, Y. M. C. A., 56 Peter Street, Manchester, England. Annual meeting, January. *President,* W. H. Machin; *Vice-Presidents,* A. C. Harrison, G. T. White, W. H. Cheetham; *Honorary Secretary,* J. W. Price, 56 Peter Street; *Honorary Treasurer,* J. D. Birchall.

MIDLOTHIAN CAMERA CLUB.—Established 1889. Headquarters, 69 Trafalgar Lane, Leith, Scotland. Annual meeting, November. *President,* Dr. W. Stewart; *Vice-President,* Arch. Wilson; *Secretary,* Thomas Wilson; *Treasurer,* R. C. Ewart.

THE MONKLANDS PHOTOGRAPHIC SOCIETY.—Established February, 1893. Headquarters, Airdrie, Scotland. Annual meeting, first Tuesday of October. *President,* T. A. Macfarlane; *Vice-President,* Thos. A. Deas; *Secretary,* Wm. Dixon Gray, Stanfield, Airdrie; *Treasurer,* James S. Lewis.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.—Established January 25, 1881. Headquarters, Y. M. C. A., Blackett Street, Newcastle-on-Tyne, England. Annual meeting, fourth Tuesday in October. *President,* Geo. B. Bainbridge; *Vice-Presidents,* J. P. Gibson, W. S. Corder, J. S. B. Bell, T. M. Clague; *Secretary,* Godfrey Hastings; *Treasurer,* James Baty.

NEWTON HEATH CAMERA CLUB.—Established 1893. Headquarters, Wesleyan School, Oldham Road, Newton, England. *President,* Mr. Fallows; *Vice-President,* Mr. Cresswell; *Secretary,* J. Fortune.

NORTHAMPTON NATURAL HISTORY SOCIETY AND FIELD CLUB—PHOTOGRAPHIC SECTION.—Established 1882. Headquarters, 1a Sheep Street, Northampton. *President*, H. Mansfield, Esq.; *Secretary*, C. H. Dorman, A.R., B.A., 51 Abington Street, Northampton.

NORTH MIDDLESEX PHOTOGRAPHIC SOCIETY.—Established 1888. Headquarters, Jubilee House, Hornsey Road, N. London. Annual meeting, second Monday in January. Weekly meetings. *President*, J. C. S. Mummery; *Vice-Presidents*, W. Brame Goodwin and A. H. Lisett; *Secretary*, H. Stuart; *Treasurer*, Henry Smith.

NOTTINGHAM CAMERA CLUB.—Headquarters, Mechanics' Institution, Nottingham, England. Annual meeting, first Friday in October. *President*, His Grace the Duke of Newcastle; *Secretary*, Lawrence Wilkens, Esq.

OLDHAM PHOTOGRAPHIC SOCIETY.—Established May, 1867. Headquarters, The Lyceum, Union Street, Oldham, England. Annual meeting, September. *President*, R. T. Taylor; *Vice-President*, T. Widdop; *Secretary*, S. Ashton; *Treasurer*, J. Whitehead.

OXFORD CAMERA CLUB.—Established 1894. Headquarters, University Museum, Oxford, England. Annual meeting, January. *President*, Sir W. J. Herschel, Bart.; *Vice-Presidents*, Miss Acland, Col. Truply, Miss Venables, Claude Rippon; *Secretary*, Geo. W. Norton, 149 Woodslock Road; *Treasurer*, R. A. R. Bennett.

PAISLEY PHOTOGRAPHIC SOCIETY.—Established 1857. Headquarters, 28 Oakshaw Street, Paisley. Annual meeting, October. *President*, Rev. John Crouch; *Vice-President*, Thos. Reid, Jr.; *Secretary*, Robert Milne, 94 High Street; *Treasurer*, Andrew Morris.

PETERBORO' PHOTOGRAPHIC SOCIETY.—Established 1887. Headquarters, the "Bedford" Hotel. Annual meeting, July. *President*, Dr. G. Kirkwood; *Secretary*, A. C. Taylor; *Treasurer*, H. C. Lilley.

PHOTOGRAPHIC RECORD OF WARWICKSHIRE. Established 1889. Headquarters, Norwich Union Chambers, Birmingham, England. Annual meeting, January. *President*, Sir J. Benjamin Stone, M.P., F.R.C.S., F.L.S.; *Vice-President*, J. H. Pickard; *Secretary*, Geo. Whitehouse; *Treasurer*, G. F. Lyndon.

PHOTOGRAPHIC SECTION OF THE PAISLEY PHILOSOPHICAL INSTITUTION.—Established 1857. Headquarters, 28 Oakshaw Street, Paisley, Scotland. Annual meeting, April. *President*, Rev. John Crouch; *Vice-President*, David Black; *Secretary*, Robert Milne, 2 Charlotte Place; *Treasurer*, Robert Easton.

PHOTOGRAPHIC SECTION OF THE YORKSHIRE PHILOSOPHICAL SOCIETY. Established 1888. Headquarters, The Museum, York, England. Annual meeting, October, first Wednesday. *President*, Tempest Anderson, Esq., M.D., J.P.; *Secretary and Treasurer*, H. Dennis Taylor, F.R.A.S., Trenfield, Holgate, York.

PHOTOGRAPHIC SOCIETY OF IRELAND.—Headquarters, 35 Dawson Street, Dublin, Ireland. Annual meeting, April. *President*, Alfred Werner; *Vice-Presidents*, T. Ruthven, A. M. Geddis; *Secretary*, Victor E. Smyth; *Treasurer*, Wm. Bewley.

PLYMOUTH PHOTOGRAPHIC SOCIETY.—Established 1894. Headquarters, The Athenæum, George Street, Plymouth, England. Annual meeting, third Friday in September. *President,* I. Davy Turney; *Vice-Presidents,* G. F. Treleaven, C. H. Dymond; *Secretary,* Wilfred Grist; *Treasurer,* I. T. Trend.

THE POSTAL PHOTOGRAPHIC CLUB.—Established October, 1886. This Club is the oldest postal photographic society in England, with the exception of "The Talbot Album Club," which was started a few months earlier in the same year. Headquarters, Walton Manor Lodge, Oxford, England. Number of members limited to 30. *Secretary and Treasurer,* Reginald A. R. Bennett, M.A. (Oxon).

PRESTON SCIENTIFIC SOCIETY, PHOTOGRAPHIC SECTION.—Established 1896. Headquarters, 119a Fishergate, Preston, England. Annual meeting, April. *Chairman,* J. G. Shaw; *Vice-Chairman,* C. A. Swift, M.A.; *Secretary,* A. W. Cooper, 9 Jordan Street; *Treasurer,* Ed. Myres.

PUTNEY PHOTOGRAPHIC SOCIETY.—Established 1890. Headquarters, 102 High Street, Putney, Surrey, England. Annual meeting, May. *President,* R. W. J. Sheppard; *Vice-Presidents,* John A. Hodges, F.R.P.S., H. Kimber, M.P., and L. S. Zachariasen; *Secretary and Treasurer,* Wm. Martin, 4 Lower Parkfields, Putney, S. W.

RAMSGATE CAMERA CLUB.—Established 1894. Headquarters, Victoria Temperance Hotel, Ramsgate, England. Annual meeting, March. *President,* vacant; *Vice-Presidents,* E. E. Wastall, Esq., J.P.; W. C. Bull, B.A., and W. T. Davey, Esq.; *Secretary and Treasurer,* Frederick I. Bear, 1 Guilford Lawn.

REDHILL AND DISTRICT CAMERA CLUB.—Established December, 1898. Headquarters, Market Hall, Redhill, Surrey, England. Annual meeting, January. *President,* Francis H. Ellwood, L.D.S., R.C.S.I.; *Secretary,* William Rowlinson; *Treasurer,* H. J. Blacklee, M.B., M.R.C.S.

RICHMOND CAMERA CLUB.—Established 1890. Headquarters, Greyhound Hotel, Richmond, England. Annual meeting, May. *President,* F. P. Cembrano; *Vice-Presidents,* G. Ardaseer, C. H. Davis; *Secretary,* E. G. Richardson; *Treasurer,* J. B. Huddy.

ROCHDALE AND DISTRICT PHOTOGRAPHIC SOCIETY.—Established 1890. Headquarters, unsettled. *President,* I. A. Bright, Esq., J.P.; *Secretaries,* H. and W. Bamford, 242 Yorkshire Street, Rochdale, England.

RODLEY PHOTO SOCIETY.—Established 1893. Headquarters, Rodley, near Leeds, England. Annual meeting, January. *President,* G. W. Bentley; *Secretary,* H. Crossley, Rodley, near Leeds; *Treasurer,* Harry Hardaker.

RONTGEN SOCIETY.—Established 1897. Headquarters, 20 Hanover Square, London, England. Annual meeting, first Thursday in July. *President,* Herbert Jackson, F.C.S.; *Secretary,* F. Harrison Low, M.B.; *Treasurer,* I. I. Vezey, F.R.M.S.

ROTHERHAM PHOTOGRAPHIC SOCIETY.—Established October, 1889. Headquarters, 5 Frederick Street, Rotherham, England. Annual meeting, first Tuesday in October. *President,* Dr. F. B. Judge Baldwin; *Vice-Presidents,* E. Isle Hubbard, J. Leadbeater, W. Rider; *Secretary,* Henry C. Hemmingway; *Treasurer,* Alfred S. Lyth.

ROYAL CORNWALL POLYTECHNIC SOCIETY.—Established 1883. Headquarters, Falmouth, England. Annual meeting, second week in February. *President,* Sir William H. Preece, K.C.B., F.R.S.; *Secretary,* Edward Kitts, F.R. Met. Soc.; *Treasurer,* R. M. Tweedy.

ROYAL PHOTOGRAPHIC SOCIETY.—Established 1853. Headquarters, 66 Russell Square, London, W. C. Annual meeting, second Tuesday in February. *President,* Thomas R. Dallmeyer, F.R.A.S.; *Vice-Presidents,* The Rt. Hon. the Earl of Crawford, K.T., F.R.S., Chapman Jones, F.I.C., F.C.S., Maj.-Gen. J. Waterhouse, I.S.C., J. W. Swan, M.A.; *Hon. Secretary,* John A. Hodges; *Assistant Secretary,* A. W. W. Bartlett; *Treasurer,* George Scamell.

SCARBOROUGH AND DISTRICT PHOTOGRAPHIC SOCIETY.—Established 1890. Headquarters, The Museum, Scarborough, England. Annual meeting, October. *President,* Mr. James Henry Rountree; *Vice-President,* Dr. Frederic Dale; *Secretary,* Mr. Harry Wanless, 31 Westborough, Scarborough; *Treasurer,* J. Whitfield.

SHAW CHURCH INSTITUTE PHOTOGRAPHIC AND ART SOCIETY.—Established 1888. Headquarters, W. Oldham, England. *President,* Rev. I. T. Ormerod; *Vice-President,* W. Warhurst; *Secretary and Treasurer,* John Maiden, 93 Rochdale Road.

SHEFFIELD OPTICAL LANTERN SOCIETY.—Established 1890. Headquarters, Saint Paul's Schools, Cambridge Street. Annual meeting, October 20. *President,* Dr. J. A. Manton; *Vice-Presidents,* Messrs. J. H. Lygo, J. Clowes; *Secretary,* T. G. F. Allen, 59 Melrose Road, Sheffield, England.

SOUTHAMPTON CAMERA CLUB.—Established 1896. Headquarters, Philharmonic Hall, Southampton, England. Annual meeting, January. *President,* W. B. Hill, F.S.I.; *Vice-Presidents,* A. Horsley Hinton, G. T. Vivian, Rev. E. C. Bennett; *Secretary,* S. G. Kimber; *Treasurer,* W. H. Trigg.

SOUTHSEA AMATEUR PHOTOGRAPHIC SOCIETY.—Established 1888. Headquarters, 5 Pembroke Road, Portsmouth, England. Annual meeting, first Wednesday in February. *President,* H. T. Lilley, M.A.; *Vice-President,* Dr. C. H. Newby; *Secretary,* F. J. Mortimer, 10 Ordnance Row, Portsea, Portsmouth; *Treasurer,* W. G. Lewis.

SOUTH SHIELDS PHOTOGRAPHIC SOCIETY.—Headquarters, Y. M. C. A. Rooms, Charlotte Terrace, South Shields, England. Annual meeting, first Tuesday in October. *President,* J. Davenport; *Vice-Presidents,* A. E. Cowling, H. G. Fowler, W. Parry, A. J. Hunter, W. Hoare, T. E. Taber; *Secretary,* A. W. Hoare; *Treasurer,* M. H. Sadler.

STAFFORD PHOTOGRAPHIC SOCIETY.—Established 1896. Headquarters, Crabbery Hall, Stafford, England. Annual meeting, third Monday in September. *President,* F. Cliff; *Vice-President,* M. Averill; *Secretary,* Henry E. Burn; *Treasurer,* George Wray.

STEREOSCOPIC CLUB, THE.—Established 1887. Headquarters, 26 King Street, Manchester. Annual meeting November. *President,* J. W. Whitelegg; *Secretary,* W. I. Chadwick, 26 King Street, Manchester.

STEREOSCOPIC SOCIETY, THE.—Established 1893. Headquarters, Huntly, N. B., Scotland. *President,* W. Stainthorpe, M.D., J.P.; *Vice-Presidents,* Victor Selb, F. Dunsterville; *Secretary and Treasurer,* B. Diveri, B.A.

SUN & CO.; POSTAL PHOTOGRAPHIC CLUB.—Established 1886. *Secretary,* Martin J. Harding, Myrtle Villa, Hawthorn Road, Shrewsbury, England.

SWANSEA ART SOCIETY (name recently changed), Swansea, England. Established 1885. Headquarters, Royal Institution of South Wales. Annual meeting, November. *President,* Colonel Morgan, R.E.; *Secretary,* Wm. Terrill; *Treasurer,* Arch. Goldie.

TALBOT ALBUM CLUB,—*Honorary Secretary,* Fred. H. Davies, 265 Coventry Road, Birmingham, England.

TUNBRIDGE WELLS AMATEUR PHOTOGRAPHIC ASSOCIATION.—Established January, 1887. Headquarters, Club Room, Mechanics' Institute, Tunbridge Wells, England. Annual meeting, January. *Patron,* Sir David Salomons, Bt., M.A.; *President,* F. G. Smart, M.A.; *Vice-Presidents,* E. R. Ashton, Rev. A. T. Scott, M.A., I. Sidney Snelgrove; *Secretary,* Joseph Chamberlain, Tankerville, Cambridge Street; *Treasurer*, B. Whitrow.

ULSTER AMATEUR PHOTOGRAPHIC SOCIETY.—Established 1885. Headquarters, The Muesum, College Square North, Belfast, Ireland. Annual meeting, second Monday in January. *President,* Wm. Gray, M.R.I.A., F.R.A.S.; *Vice-Presidents,* Cecil E. Shaw, M.A., M.D., John Brown, Alex. Tate, C.E., Prof. Letts, Ph.D., F.R.S.E., F.C.S.; *Secretary,* Thos. N. Murray; *Treasurer,* J. Campbell Carson.

UTTOXETER PHOTOGRAPHIC SOCIETY.—Established 1890. Headquarters, Carter Street, Uttoxeter, England. Annual meeting, April. *President,* Rev. C. F. L. Barnwell; *Vice-Presidents,* Hugo Meynell, Esq., and F. A. Bolton, Esq.; *Secretary,* Alfred Parker, Esq.; *Treasurer,* R. T. A. Hardy, Esq.

WAKEFIELD PHOTOGRAPHIC SOCIETY.—Established 1890. Headquarters, Church Institution, Wakefield, England. Annual meeting, June. *President,* Chas. Mills; *Vice-Presidents,* A. W. Stanfield, H. M. Briggs, Wm. Holmes; *Secretary,* Robert Robson; *Treasurer,* F. Judge.

WALSALL AMATEUR PHOTOGRAPHIC SOCIETY.—Established 1892. Headquarters, George Hotel, Walsall, England. Annual meeting, September 30. *President,* S. A. Newman, Esq.; *Secretary and Treasurer,* E. A. Day, 14 Westbourne Road, Walsall.

WALTON PHOTOGRAPHIC SOCIETY, LIVERPOOL.—Established 1889. Headquarters, Walton Church Schools. Annual meeting, second Wednesday in February. *President,* Geo. Latimer; *Secretary and Treasurer,* T. Bickerstaff, 79 Rawcliffe Road.

WARRINGTON PHOTOGRAPHIC SOCIETY.—Established 1887. Headquarters, Warrington Technical Institute. Annual meeting, January. *President,* John Fairhurst; *Vice-Presidents,* H. N. Houghton, H. Bond; *Secretary,* F. W. Knowles, 77 Bridge Street, Warrington, England; *Treasurer,* Peter Dalton.

WEST LONDON PHOTOGRAPHIC SOCIETY.—Established 1888 Headquarters, Broadway Lecture Hall, Hammersmith. Annual meeting, second Friday in October. *President,* G. Lamley, Esq.; *Past President,* G. F. Blackmore, Esq.; *Secretary,* Alfred Ebes, 183 The Grove, Hammersmith, England; *Treasurer,* H. Selby.

WEYMOUTH PHOTOGRAPHIC SOCIETY.—Established 1895. Headquarters, Technical Schools, Weymouth, England. Annual meeting, October 1. *President,* H. I. Groves; *Vice-Presidents,* T. G. Rowe, W. Callender; *Secretary,* F. C. Mace; *Treasurer,* T. Williams.

WINDSOR AMATEUR RESEARCH CAMERA CLUB.—Established 1893. Headquarters, Montpelier House, Belfast, Ireland. Annual meeting, December. *President,* Lord Mayor of Belfast, James Henderson, Esq., J.P.; *Vice-President,* James Collins; *Secretary,* Wm. Jas. Gibson, Montpelier House, Belfast; *Treasurer,* Robert B. Gardiner.

WOLVERHAMPTON AND DISTRICT UNITED PHOTOGRAPHIC SOCIETY.—Established February, 1901. Headquarters, Wolverhampton, England. Annual meeting, October. *President,* Harold Holcroft, M.A., F.C.S.; *Secretary,* James Gale; *Treasurer,* Walter Grieves.

WOODFORD PHOTOGRAPHIC CLUB. Established October, 1893. Headquarters, Wilfrid Lawson Hotel, Woodford Green, England. Annual meeting, third Wednesday in October. *President,* H. T. Malby, F.R.P.S.; *Vice-President,* A. Horsley Hinton; *Secretary and Treasurer,* F. G. Emler, 1 Florence Villas, Chelmsford Road.

WOOLWICH PHOTOGRAPHIC SOCIETY.—Established 1892. Headquarters, St. John's Schools, Woolwich, England. Annual meeting, October, second Thursday. *President,* Mr. W. H. Dawson; *Vice-Presidents,* Col. C. D. Davies and Mr. C. Churchill; *Secretary and Treasurer,* Frederick W. Nachen.

WORCESTERSHIRE PHOTOGRAPHIC SURVEY SOCIETY.—Established March 16, 1896. Headquarters, Victoria Institute, Worcester, England. Annual meeting, January or February. *President,* J. W. Willis Bund, Esq.; *Secretary,* Thos. J. Hobson, 15 Albany Terrace, Worcester; *Treasurer,* Mrs. Berkeley, Cotheridge Court, Worcester.

YORK PHOTOGRAPHIC SOCIETY.—Established 1887. Headquarters, Victoria Hall, York, England. Annual meeting, January. *President,* W. Weatherill; *Vice-President,* A. H. Hardcastle; *Secretary,* Frederick G. P. Benson, 50 Scott Street, York; *Treasurer,* R. Bainbridge.

YORKSHIRE PHILOSOPHICAL SOCIETY.—Established 1822. Headquarters, York. Annual meeting, second Monday in February. *President,* Sir Charles Strickland; *Vice-Presidents,* (12); *Secretaries,* Tempest Anderson, M.D., B.Sc., and Charles Elmhirst; *Treasurer,* Edwin Gray, LL.B.

OTHER FOREIGN SOCIETIES

AMATEUR FOTOGRAFEN VEREENIGING AT AMSTERDAM (HOLLAND).—Established September 1, 1887. Headquarters, Handboogstraat 2. Meetings on Wednesday, fortnightly. *President,* Ign. Bispinch; *Secretary,* D. Wilmerink; *Treasurer,* A. W. de Flines.

AMATEUR PHOTOGRAPHIC SOCIETY OF MADRAS.—Headquarters, Madras, India. Annual meeting, January. *President,* C. Michie Smith, B.Sc., F.R.S.E.; *Vice-Presidents,* F. Dunsterville, F.R.P.S., C. E. Phipps; *Honorary Secretary,* Samuel Jackson, A.R.C.Sc. (Lond.), F.I.C.; *Honorary Treasurer,* V. G. Lynn.

AMATEUR PHOTOGRAPHIC ASSOCIATION OF VICTORIA, THE. —Established 1883. Headquarters, Royal Arcade, Melbourne. Annual meeting, March. *President,* F. A. Kernot, Esq.; *Vice-President,* H. C. Mais, Esq., M. Inst. C.E.; *Honorary Secretary,* F. W. Miscamble, F.I.S.V.; *Honorary Treasurer,* E. K. Byrne.

AMATEUR PHOTOGRAPHEN-VEREIN IN LIEGNITZ.—Established 6th December, 1891. Mitglied des Verbandes deutscher und oesterreichischer Amateur-Photographen, Regelmässige Vereinssitzungen Freitag nach dem 1. und 15. eines jeden Monats. Annual meeting, im Februar jedes Jahres. *President,* Max Engler, Ober-Postassistent; *Secretary and Treasurer,* Erdmann Loebner.

AMATOR FOTOGRAFEN, CHRISTIANIA.—Established April 24, 1889. Headquarters, Christiania. Annual meeting, September. *President,* Dr. Oscar Platon, Professor at the University, Christiania; *Vice-President,* Mr. Jespersen, School Director; *Secretary,* Mr. Rekstad; *Treasurer,* I. J. Mörch.

ASSOCIATION BELGE DE PHOTOGRAPHIE.—Headquarters, Brussels. Annual meeting, April. *President,* J. Casier; *Vice-Presidents,* J. Maes and F. Massange de Louvrex; *Secretary,* M. Vanderkindere; *Treasurer,* A. Nyst.

ASSOCIAZIONE DEGLI AMATORI DI FOTOGRAFIA.—Headquarters, Via Nazionale, 143a, Roma. *President,* Antonio Ruffo, Principe della Scaletta; *Vice-President,* Comm. Carlo Encrani; *Secretary,* Aev. Giuseppe Martini; *Treasurer,* Br. Francesco Bondesio.

AUCKLAND PHOTOGRAPHIC CLUB.—Established 1885. Headquarters, Club Rooms, Grey Street. *President,* Dr. J. Logan Campbell; *Vice-Presidents,* J. R. Hanna, Jos. Martin, Ele Sayton; *Secretary,* H. R. Arthur, care Auck. Gas Co.; *Treasurer,* W. Gatenby.

CAPE TOWN PHOTOGRAPHIC CLUB.—Established 1890 Headquarters, Y. M. C. A., Cape Town. Annual meeting, first Thursday in November. *President,* David Gill, LL.D., F.R.S., etc.; *Vice-President* (changes annually); *Secretary and Treasurer,* Hy. Bishop, Afr. Bankg. Corp., Cape Town.

CIRCOLO FOTOGRAFICO LOMBARDO.—400 members. Milano, Via Principe Umberto, 30. *President,* Conte Cesare del Majno; *Vice-President,* Zambellini Avv. Michele; *Secretary,* Borghi Dott. Giuseppe; *Director,* Chizzolini Ing. Antonio; *Manager,* Ritter Vittorio; *Councillors,* Bassani Gigi. Canetta Rag. Ettore; *Auditor of Accounts,* Vittorio Zuccoli-Ing. Piero Fontana.

CLUB ALPIN SUISSE.—Fondé en 1863. Headquarters, Neuchatel (Comité central). *President,* M. Engène Colomb; *Vice-President,* M. Alexandre Perrochet; *Secretary,* Dr. Charles Meckenstock; *Treasurer,* M. Fritz Sandoz.

CLUB DER AMATEUR FOTOGRAFEN.—Established 1891. Headquarters, Salzburg. Sitzungen Monatlich. *President,* K.-K. Ober Commiss. Adolf Porm; *Vice-President,* Br. von Lilien, Rittmeister; *Secretary,* K.-K. Forstsecretar Dr. Franz Huemer, Fünfhaus.

CORRESPONDENZ-VEREIN VON FREUNDEN DER PHOTOGRAPHIE.—Established 1889. Die Mitglieder, die innerhalb Deutschland wohnen, verkehren mit einander durch Wanderkästen. *Hauptordner,* Pastor M. Allihu; *Ordner des I. Kreises,* O. Küllenberz; *des II. Kreises,* Graf. Rothkirch; *des III. Kreises,* G. Richter.

"DAGUERRE" CLUB. Established 1891. Headquarters, Groningen, The Netherlands. *President,* G. T. Smith; *Vice-President,* R. Roelfsema; *Secretary,* N. de Jager; *Treasurer,* J. H. J. Gorter.

DEUTSCHE GESELLSCHAFT VON FREUNDEN DER PHOTOGRAPHIE.—Established 1887. Headquarters, Königliche Kriegs Akademie. Annual meeting, Photographische Rundschau. *President,* Geheimrath Prof. Dr. Tobold; *Secretary,* Dir. Schultz-Hencke; *Treasurer,* Banquier Gvemann.

DEUTSCHER PHOTOGRAPHEN-VEREIN.—Established December 29, 1876. Headquarters, Weimar, Germany. Alljährlich eine Wanderversammlung, 1901 in Weimar, 1902 in Dusseldorf. *President,* K. Schwier, Weimar; *Vice-President,* Ernst Sonntag, Trachan; *Secretary für Protokolls,* C. Kesselhuth, Hildesheim; *Secretary für Correspondenz,* K. Schwier, Weimar.

DILETTANTI FOTOGRAFI DI NAPOLI (NAPLES CAMERA CLUB).—Established 1885. Headquarters, Villa Nazionale Napoli. Annual meeting, January. *President,* Duca di Schiavi; *Vice-President,* Sigr. Waldemaro Fuchs; *Secretary,* Sigr. Cav. Raffaele Montuoro; *Treasurer,* Sigr. Cav. Luigi Fortunato.

DRESDEN GESELLSCHAFT ZUR FORDERUNGDER AMATEUR-PHOTOGRAPHIE. Established 1897. Headquarters, Vereinshaus, Zinzendorfstrasse 17, Dresden, Germany. Meetings, twice a month. *President,* E. Frohne, Schumanstrasse 24; *Vice-President,* Herman Schnauss; *Secretary,* Hugo Anatz; *Treasurer,* Max Hermann.

DUNEDIN PHOTOGRAPHIC SOCIETY, NEW ZEALAND.—Established 1883. Headquarters, Liverpool Street, Dunedin. Annual meeting, third Wednesday in March. *President,* A. I. Barth; *Vice-Presidents,* R. Chisholm and W. Melville; *Secretary and Treasurer,* I. Skottowe Webb, National Insurance Co., Dunedin, N. Z.

WINTER *By J. H. Field*

FOOCHOW CAMERA CLUB.—Established 1892. Headquarters, Foochow. *Secretary,* Wilbur T. Gracey.

FOTOGRAFIAMATORKLUBBEN I HELSINGFORS. Established 1889. Headquarters, Helsingfors, Finland. Annual meeting, September. *President,* Otto Johansson; *Secretary,* Werner Lindbohm.

GORDON COLLEGE AMATEUR PHOTOGRAPHIC ASSOCIATION.—Established 1889. Headquarters, Gordon College, Geelong, Victoria. Annual meeting, July. *President,* H. G. Roebuck, Esq.; *Vice-Presidents,* J. Smith and T. Lord; *Secretary,* J. Hammerton, Jr., "Burngreave," Geelong, Vic.; *Treasurer,* S. J. R. Mawson.

HAAGSCHE PHOTO-CLUB "DAGUERRE." Headquarters, The Hague, Holland. Annual meeting, July. *President,* G. Du Ry van Beest Holle; *Secretary,* George S. de Feer, Jr.; *Treasurer,* H. W. Barnet Lyon.

HAMILTON (ONT.) CAMERA CLUB.—Established 1892. Headquarters, Public Library Building. Annual meeting, first Monday in April.. Regular meeting, first and second Monday of month. *President,* A. H. Baker; *Vice-President,* J. R. Heddle; *Secretary,* D. A. Souter; *Treasurer,* Geo. H. Lees.

MARITZBURG CAMERA CLUB.—Established 1893.. Headquarters, Pietermaritzburg, S. Africa. Annual meeting, first Wednesday in May. *President,* D. M. Eadie; *Vice-President,* S. S. Watkinson; *Secretary,* A. R. Hopkins; *Treasurer,* P. F. Loney.

MONTREAL CAMERA CLUB.—Established 1890. Incorporated 1892. Headquarters, 4 Phillips Square, Montreal. Annual meeting, first Tuesday in May. *President,* George Sumner; *Vice-President,* Alfred W. Cole; *Secretary,* W. A. Scott; *Treasurer,* A. Clarence Lyman.

NELSON CAMERA CLUB, NELSON, N. Z.—Established 1888. Headquarters, Nelson. Annual meeting, June. *President,* C. Y. Fell; *Secretary,* Arthur H. Patterson; *Treasurer,* F. W. Hamilton.

NEW SOUTH WALES RAILWAY AND TRAMWAY CAMERA CLUB.—Established October, 1894. Headquarters, Railway Institute, Sydney, N. S. W. Annual meeting, first Monday in October. *President,* H. McLachlan, Esq. (Secretary to Railway Commissioners); *Vice-President,* H. Carruthers, Esq. (Locomotive Accountant); *Secretary,* Mr. J. Sconlar (Chief Draughtsman); *Treasurer,* Mr. J. Paterson (Clerk Railway Offices).

NORTHERN TASMANIAN CAMERA CLUB.—Established 1889. Headquarters, Launceston, Tasmania. Annual meeting, July. *President,* Rev. F. J. Nance, M.A.; *Vice-Presidents,* Mr. Wm. Aikenhead, M.H.A.; Mr. R. C. Kermowde, Mr. H. B. Brownrigg; *Secretary and Treasurer,* Mr. F. Styant Browne.

NYMEGEN AMATEUR FOTOGRAFEN VEREENIGING "M. L."—Established 1893. Headquarters, Nymegen, Holland. *President,* Jacq. Kneppers; *Secretary,* Brn. van Hemert tot Dingshof; *Treasurer,* Van de Graaff.

OTTAWA CAMERA CLUB, OTTAWA, CANADA.—Established 1894. Headquarters, Ottawa, Canada. Annual meeting, 2d Thursday in October of each year. *President,* William Ide; *Vice-President,* Miss I. M. Ballantyne; *Secretary and Treasurer,* A. Ballantyne.

PHOTO-CLUB DE LYON.—Established en 1888. Headquarters, 12 Rue de la Charité. Annual meeting, December. *President,* Irénée Brun; *Vice-Presidents,* Bégule, Dueurtyl; *Secretary,* Jean Bernard; *Treasurer,* Ferdinand Abel.

PHOTO-CLUB. Headquarters, Place Piaget 9, Neuchatel, Switzerland. *President,* V. Attinger; *Vice-President,* Jean Bachelin; *Secretary,* Mr. Chable; *Treasurer,* Jean Pretre.

PHOTO-CLUB DE PARIS. Established 1888. Headquarters, Paris, France. Annual meeting, December. *President,* Maurice Bucquet; *Vice-President,* E. Martin; *Secretary,* P. Bourgeois; *Treasurer,* H. Guerin.

PHOTO-CLUB, ORAN, ALGERIA.—Established 1892. Headquarters, 12 Boulevard Séguin. Annual meeting, second Sunday in December. *President,* A. Godillot, notaire; *Vice-President,* Capitaine Michel, du 2d Régiment des Zouaves; *Secretary,* J. S. Levy, 51 Bd. National; *Treasurer,* E. Brenant.

PHOTO-CLUB ROUENNAIS.—Société d'Amateurs Photographs, fondée 1891. Siège social, Hôtel des Sociétés savantes, Rouen, France. Atelier de pose—Laboratoire—Bibliothéque, salle de lecture, ouvrages et journaux spéciaux, Rue de la République, 43. *President,* M. Abel. Buguet, A.; *Vice-Presidents,* MM. Louis Chesneau-Lethuillier, Albert Margeury; *Treasurer,* Charles Lebert; *Secretary,* Maurice Lucas, rue du Sacre, 9.

PHOTOGRAPHIC SECTION OF IMPERIAL RUSSIA TECHNICAL SOCIETY. Established 1878. Headquarters, Panteleimonskaia 2, St. Petersburg, Russia. *President,* Mr. Erzemsky; *Vice-President,* Mr. Sresnevsky; *Secretary,* Mr. Popovitski.

PHOTOGRAPHIC SOCIETY OF INDIA, THE.—Established 1886. Headquarters, 57 Park Street, Calcutta. Annual meeting, January. *President,* N. Giannacopulo, Esq.; *Vice-Presidents,* A. Caspersz and A. Tocher; *Secretary,* Alex. Ross Catto; *Treasurer,* C. H. Coates.

PHOTOGRAPHISCHE GESELLSCHAFT.—Established 1861. Headquarters, in Wien. Annual meeting, Januar. President, Ottomar Volkmer; *Vice-President,* Dr. Carl Böhm Edler von Böhmersheim; *Secretary,* Dr. Joseph Székely; *Treasurer,* Ludwig Schrank.

PHOTOGRAPHISCHE GESELLSCHAFT WINTERTHUR.—Established 1893. Headquarters, Winterthur, Switzerland. Meetings, Jeden monat. *President,* A. Sulzer-Seifert; *Vice-President,* Hüni; *Secretary,* Wurz; *Treasurer,* Mayerhofer.

PHOTOGRAPHISCHER VEREIN ZU BERLIN.—Established 1863. Headquarters, Architekten-Vereinshaus, Berlin, S. W. Meetings, Jeden 3ten Donnerstag im Monat. *President,* Hofphotograph Paul Grundner; *Secretary,* Director D. Schultz-Hencke; *Treasurer,* E. Martini i. fa. Schippang & Co.

PHOTOGRAPHISCHER VEREIN IN GOTTINGEN.—Established Mai, 1893. Headquarters, Hotel "Englisher Hof" in Göttingen. Annual meeting, April. *President,* Dr. Götting; *Secretary,* Professor Dr. Abegg; *Treasurer,* Horstmann.

PHOTO-UNION FRANCAISE.—Headquarters, Rue du Pont-Mouja No. 1. (20 membres.) Réunion tous les mois. *President,* Aéiné Voignier; *Vice-President,* Charles Schmitt; *Secretary,* Felix Roy; *Treasurer,* Henri Chouvenin.

PORT ELIZABETH AMATEUR PHOTOGRAPHIC SOCIETY.—Established 1890, Port Elizabeth, So. Africa. Headquarters, The Studio Athenæum. Annual meeting, third Thursday in July. *President,* A. Walsh, Esq.; *Chairman,* W. Alcock, Esq.; *Secretary,* F. C. Raph; *Treasurer,* J. Lewis.

QUEENSLAND AMATEUR PHOTOGRAPHIC SOCIETY.—Established 1883. Headquarters, Brisbane, Australia. Annual meeting, January (second Thursday). *President,* Arthur W. Pigott; *Vice-Presidents,* Dr. Wilton Love, Dr. Wheeler, Mr. C. J. Pound; *Secretary,* W. C. Voller, Queen Street, Brisbane; *Treasurer,* J. L. Kinloch.

SCHWEIZER ALPEN CLUB.—Headquarters, Winterthur (Canton Zurich). Annual meeting, October. *President,* Prof. Dr. E. Bosshard; *Vice-President,* T. A. Denzler; *Secretary,* Dr. T. Vodoz; *Treasurer,* F. Schöllhorn.

SCHWEIZERISCHER PHOTOGRAPHEN VEREIN.—Established 1886. *President,* E. Pricam, Genl ; *Vice-President,* R. Ganz, Zürich; *Secretary,* Hermann Linck, Winterthur; *Treasurer,* A. Wicky, Bern; *Bibliothekar,* Ph. Linck, Zürich.

SOCIETE DES AMATEURS PHOTOGRAPHES DE PARIS.—Headquarters, 339 rue St. Martin, Paris. *President,* H. Laedlein; *Vice-President,* Dufresne; *Secretary,* Maxime Brault, 97 Bı Malesherbes, Paris; *Treasurer,* Mongodin.

SOCIETE D'ETUDES PHOTOGRAPHIQUES DE PARIS.—Headquarters à Paris, 11 rue Salneuve, chez M. Balagny. Assemblée Générale tous les mois. *President,* Balagny, Docteur en Droit; *Vice-President,* Villain, Chimiste; *Secretary,* Normand, Membre de l'Institut de France; *Treasurer,* M. Lepetit.

SOCIETE FRANCAISE DE PHOTOGRAPHIE.—Fondée en 1854. Headquarters, 76 rue des Petits Champs, Paris. Réunions le 1er Vendredi de chaque mois, sauf en Septembre et Octobre. *President,* M. Janssen; *Vice-President,* M. A. Davanne; *Secretary,* M. L. Pector; *Treasurer,* M. Andra.

SOCIETE GENEVOISE DE PHOTOGRAPHIE.—Established 1881. Headquarters, Grand Mésel 1, Genève. Meeting, every month. *President,* Dr. A. Mazel; *Vice-President,* Dr. E. Batault; Secretary, T. Bosson; *Treasurer,* Ls. Jaquerod.

SOCIETE PHOTOGRAPHIQUE DE RENNES.—Headquarters, 4 rue de la Chalotais. *President,* Georges Fontaine; *Vice-President,* Vicomte Ch. de Rengervé; *Secretary,* Auguste Morel.

SOCIETE PHOTOGRAPHIQUE PROFESSIONALE, SUCCEDANT A CERCLE DES EFFIGISTES ET SOCIETE DES EMPLOYES PHOTOGRAPHES.—Established 1878, 30 membres. Headquarters, Place St. Gervais, 6. Annual meeting, Juillet. Réunion 1er Lundi de chaque mois. *President,* T. Dovaz, 3 rue des Minoteries; *Vice-President,* F. Mazuy, 4 Place Cornavin; *Secretary,* A. Chevalley, rue Pradier, 9; *Treasurer,* F. Barral, rue des Bains. Toutes les communications au Secrétaire.

SOUTH AUSTRALIAN PHOTOGRAPHIC SOCIETY.—Established 1885. Headquarters, Chamber of Manufactures, Adelaide. Annual meeting. 2d Thursday in July. *President,* C. L. Whitham; *Vice-Presidents,* R. F. Griffiths and Andrew Scott, B.A.; *Secretary,* J. Gazard, 111 King William Street, Adelaide; *Treasurer,* S. P. Bond.

TORONTO CAMERA CLUB.—Established 1887. Headquarters, Forum Building, Yonge and Gerrard Streets. Annual meeting, 1st Monday in November. *President,* W. H. Moss; *First Vice-President,* Alex. Bunten; *Second Vice-President,* H. B. Lefroy; *Secretary and Treasurer,* John J. Woolnough, 32 Cottingham Street.

TORONTO CENTRAL Y. M. C. A. CAMERA CLUB, THE.—Established 1899. Headquarters, Toronto, Ontario. *President,* Dr. Price; *Vice-President,* W. R. Moffat; *Secretary and Treasurer,* John Powell.

UNION NATIONALE DES SOCIETES PHOTOGRAPHIQUES DE FRANCE.—Established en 1892. Headquarters, 76 Rue des Petits-champs, Paris. Annual meeting, Pentecote. *President,* M. Janssen, de l'Institut; *Vice-President,* M. Bucquet (M.); *Secretary,* M. Pector (S.); *Treasurer,* M. Berthaud (M.).

VEREIN VON FREUNDEN DER PHOTOGRAPHIE.—Established Braunschweig, 1889. Headquarters, Hôtel Preussischer Hof. Meeting, Monatlich, am Mitwoch nach dem 15ten. *President,* Dr. phil. David Kaempfer; *Vice-President,* Dr. med. Felix Aronheim; *Secretary,* Adolf Steinhausen; *Treasurer,* Willy Berge.

VEREIN VON FREUNDEN DER PHOTOGRAPHIE ZU JENA.—Established 1. September, 1891. Meetings, Jeden 1. und 3. Donnerstag im Monat im Gasthof zur Guten Quelle. Praktischer Rathgeber. *President,* Konrad Roch; *Vice-President,* C. Hoffmann; *Secretary,* Oscar Trinkler; *Treasurer,* Carl Spath.

VEREIN ZUR FOERDERUNG DER PHOTOGRAPHIE.—Established 1869. Headquarters, Berlin. Meetings, once a month. *President,* Dr. Kiesling; *Vice-President.* Dr. E. Vogel; *Secretary,* P. Hanneke, W. Bülowstr. 99; *Treasurer,* Gustav Schmidt, W. Lützow 27.

VEREIN ZUR PFLEGE DER PHOTOGRAPHIE UND VERWANDTER KUENSTE.—Established in 1875. Headquarters, Frankfort-a-M. Meetings monthly. *President,* Professor F. Schmidt, at Karlsruhe; *Vice-President,* Herm Maas, Photographer, Frankfort-a-M.; *Secretary,* Th. Haake, Manufacturer, owner of the firm of Haake & Albers, at Frankfort-a-M.; *Treasurer,* C. Böttcher, Photographer, Frankfort-a-M.

WANGANUI CAMERA CLUB.—Established 1894. Headquarters, Wanganui, New Zealand. Annual meeting, September. *President,* Saynor Griffiths, Esq.; *Vice-President,* F. Denton, Esq.; *Secretary and Treasurer,* C. W. Babbage.

WELLINGTON CAMERA CLUB.—Established 1892. Headquarters, Wellington, New Zealand. Annual meeting, second Thursday in October. *President,* A. de Bathe Brandon; *Vice-Presidents,* T. McLellan and A. C. Gifford; *Secretary,* J. A. Heginbotham; *Treasurer,* T. M. Hardy.

WINNIPEG (ONT.) CAMERA CLUB.—Established 1898. Headquarters, McIntyre Block. Annual meeting, second Tuesday in April. *President,* F. W. Drewry; *Vice-President,* F. J. C. Cox; *Secretary,* Gordon W. Johnson; *Treasurer,* J. G. Norris.

WORKINGMAN'S COLLEGE PHOTOGRAPHIC CLUB.—Established 1892. Headquarters, Workingman's College, Melbourne, Victoria. Annual meeting, May. *President,* Professor Kernot, M.E.; *Vice-Presidents,* F. A. Campbell, C.E., T. C. Camm, A. J. Campbell; *Secretary,* Arthur J. Relph, Government Printing Office, Melbourne; *Treasurer,* J. Paterson.

TABLES

TABLE OF THE ELEMENTS:

THEIR SYMBOLS, ATOMIC WEIGHTS, AND EQUIVALENTS.

	Symbol.	Atomic Weight.	Equivalent.		Symbol.	Atomic Weight.	Equivalent.
Aluminium	Al	27.02	9.007	Mercury	Hg	199.8	99.9
Antimony	Sb	120.	40.	Molybdenum	Mo	95.8	19.16
Arsenic	As	74.9	24.97	Nickel	Ni	58.6	29.3
Barium	Ba	136.8	68.4	Niobium	Nb	94.	31.33
Beryllium	Be	9.08	4.54	Nitrogen	N	14.01	4.67
Bismuth	Bi	208.	69.33	Osmium	Os	193.	24.125
Boron	B	10.9	3.66	Oxygen	O	15.96	7.98
Bromine	Br	79.75	79.75	Palladium	Pd	106.2	26.55
Cadmium	Cd	112.	56.	Phosphorus	P	30.96	10.32
Cæsium	Cs	133.	132.7	Platinum	Pt	194.3	48.575
Calcium	Ca	39.9	19.95	Potassium	K	39.04	39.04
Carbon	C	11.97	2.99	Rhodium	Ro	104.	26.
Cerium	Ce	139.9	46.6	Rubidium	Rb	85.2	85.2
Chlorine	Cl	35.37	35.37	Ruthenium	Ru	104.4	26.1
Chromium	Cr	52.4	26.2	Selenium	Se	78.8	39.4
Cobalt	Co	59.	29.5	Silicon	Si	28.3	7.
Copper	Cu	63.2	31.6	Silver	Ag	107.66	107.66
Didymium	Di	143.0	47.8	Sodium	Na	23.	23.
Erbium	E	165.9	55.3	Strontium	Sr	87.3	43.65
Fluorine	F	19.1	19.1	Sulphur	S	31.98	15.99
Gallium	Ga	69.	23.	Tantalum	Ta	182.	60.67
Gold	Au	197.	65.66	Tellurium	Te	125.	62.5
Hydrogen	H	1.	1.	Thallium	Tl	203.64	203.64
Indium	In	113.4	37.8	Thorium	Th	231.87	57.97
Iodine	I	126.53	126.53	Tin	Sn	117.8	58.9
Iridium	Ir	192.5	48.125	Titanium	Ti	48.0	12.
Iron	Fe	55.9	27.95	Tungsten	W	183.6	30.6
Lanthanum	La	138.5	46.17	Uranium	U	240.	60.
Lead	Pb	206.4	103.2	Vanadium	V	51.2	17.07
Lithium	Li	7.01	7.01	Yttrium	Y	89.6	29.87
Magnesium	Mg	24.	12.	Zinc	Zn	65.2	32.6
Manganese	Mn	55.	27.5	Zirconium	Zr	90.	45.

NOTE.—The equivalent numbers are the smallest quantities of the element that unite with one part of hydrogen, eight parts of oxygen, or thirty-five parts of chlorine.

THE CONVERSION OF GRAMMES (OR CUBIC CENTIMETERS) INTO OUNCES AND GRAINS, and *vice versa.*

Conversion of Grammes into Grains.

Grammes.	Grains.
1	15.43
2	30.86
3	46.29
4	61.73
5	77.16
6	92.59
7	108.03
8	123.46
9	138.89

Conversion of Grains into Grammes.

Grains.	Grammes.
1	.0648
2	.1296
3	.1944
4	.2592
5	.3240
6	.3888
7	.4536
8	.5184
9	.5832

Conversion of Grammes into Troy Ounces.

Grammes.	Troy Ounces.
1	.03215
2	.06430
3	.09645
4	.12860
5	.16075
6	.19290
7	.22505
8	.25720
9	.28935

Conversion of Troy Ounces into Grammes.

Troy Ounces.	Grammes.
1	31.103
2	62.207
3	93.310
4	124.414
5	155.517
6	186.621
7	217.724
8	248 828
9	279.931

Conversion of Grammes into Avoirdupois Ounces.

Grammes.	Avoirdupois Ounces.
1	.03527
2	.07054
3	.10581
4	.14108
5	.17635
6	.21162
7	.24689
8	.28216
9	.31743

Conversion of Avoirdupois Ounces into Grammes.

Avoirdupois Ounces.	Grammes.
1	28.349
2	56.699
3	85.048
4	113.398
5	141.747
6	170.097
7	198.446
8	226.796
9	255.145

The use of the tables will be best illustrated by an example. Supposing that it is desired to find the equivalent in grains of 324.51 grammes, we proceed by breaking up this number into the following series of constituent parts, and finding the grain-equivalent of each part from the table.

Portions of original number.	Equivalents in grains.
300.	4630.
20.	308.6
4.	61.73
.50	7.716
.01	.1524
	5008.1984

The required quantity is 5008.2 grains. The numbers taken from the table will, in most cases, require a change as regards the position of the decimal point; thus, to find the value of 300 grammes, one refers to the table and finds 46.30 given as the equivalent, and a mere shifting of the decimal point two places towards the right multiplies this by 100, or gives the required number. In a similar manner, by shifting the decimal place of 30.86 one place to the right, we obtain the value in grains of 20 grammes; while the number 61.73 is taken from the table without alteration as the equivalent of 4 grammes. For .50 the table number must have its point shifted to the left, making it 7.716 instead of 77.16; and finally the value of .01 is obtained by shifting the point of 15.43 two places to the left.

Engraved by George H. Benedict Eng. Co., Chicago, Ill.

Photographed and Copyright 1901 *by J. H. Tarbell*

'WAY DOWN SOUTH.

THERMOMETRIC TABLES.

Showing the Assimilation of the Thermometers in Use Throughout the World.

Celsius.	Réaumur.	Fahrenheit.	Celsius.	Réaumur.	Fahrenheit.
100	80.0	212.0	49	39.2	120.2
99	79.2	210.0	48	38.4	118.4
98	78.4	208.4	47	37.6	116.6
97	77.6	206.6	46	36.8	114.8
96	76.8	204.8	45	36.0	113.0
95	76.0	203.0	44	35.2	111.2
94	75.2	201.2	43	34.8	109.4
93	74.4	199.4	42	33.6	107.6
92	73.6	197.6	41	32.8	105.8
91	72.8	195.8	40	32.0	104.0
90	72.0	194.0	39	31.2	102.2
89	71.2	192.2	38	30.4	100.4
88	70.4	190.4	37	29.6	98.6
87	69.6	188.6	36	28.8	96.8
86	68.8	186.8	35	28.0	95.0
85	68.0	185.0	34	27.2	93.2
84	67.2	183.2	33	26.4	91.4
83	66.4	181.4	32	25.6	89.6
82	65.6	179.6	31	24.8	87.8
81	64.8	177.8	30	24.0	86.0
80	64.0	176.0	29	23.2	84.2
79	63.2	174.2	28	22.4	82.4
78	62.4	172.4	27	21.6	80.6
77	61.6	170.6	26	20.8	78.8
76	60.8	168.8	25	20.0	77.0
75	60.0	167.0	24	19.2	75.2
74	59.2	165.2	23	18.4	73.4
73	58.4	163.4	22	17.6	71.6
72	57.6	161.6	21	16.8	69.8
71	56.8	159.8	20	16.0	68.0
70	56.0	158.0	19	15.2	66.2
69	55.2	156.2	18	14.4	64.4
68	54.4	154.4	17	13.6	62.6
67	53.6	152.6	16	12.8	60.8
66	52.8	150.8	15	12.0	59.0
65	52.0	149.0	14	11.2	57.2
64	51.2	147.2	13	10.4	55.4
63	50.4	145.4	12	9.6	53.6
62	49.6	143.6	11	8.8	51.8
61	48.8	141.8	10	8.0	50.0
60	48.0	140.0	9	7.2	48.2
59	47.2	138.2	8	6.4	46.4
58	46.4	136.4	7	5.6	44.6
57	45.6	134.6	6	4.8	42.8
56	44.8	132.8	5	4.0	41.0
55	44.0	131.0	4	3.2	39.2
54	43.2	129.2	3	2.4	37.4
53	42.4	127.4	2	1.6	36.5
52	41.6	125.6	1	0.8	33.8
51	40.8	123.8	0	0.0	32.0
50	40.0	122.0			

DR. SCOTT'S TABLE OF COMPARATIVE EXPOSURES.

The following table, compiled by Dr. J. A. Scott, shows the comparative value of daylight at different hours of the day and seasons of the year, and is intended for use in conjunction with that of Mr. W. K. Burton :

Table of Comparative Exposures.

Hour of Day. A.M.	Hour of Day. P.M.	June.	May, July.	April, Aug.	Mar., Sept.	Feb., Oct.	Jan., Nov.	Dec.
12		1	1	1¼	1½	2	3½	4
11	1	1	1	1¼	1½	2½	4	5
10	2	1	1	1¼	1¾	3	5	6
9	3	1	1¼	1½	2	4	*12	*16
8	4	1½	1½	2	3	*10	--	--
7	5	2	2½	3	*6	--	--	--
6	6	2½	*3	*6	--	--	--	--
5	7	*5	*6	--	--	--	--	--
4	8	*12	--	--	--	--	--	--

* The accuracy of these figures would be affected by a yellow sunset.

MR. BURTON'S TABLE OF COMPARATIVE EXPOSURES

(SLIGHTLY ALTERED).

	Sea and Sky.	Open Landscape.	Landscape and Foreground. / Buildings.	Heavy Foliage. Foreground. / Portrait out of Doors.	Portrait in Studio Light.	Portrait in Ordinary Room.	Under Trees. / Fairly Lighted Interiors.	Badly Lighted Interiors.
F/16	1/10 sec.	1/3 sec.	1 sec.	2 sec.	16 sec.	1 min.	2½ min.	½ hour.
F/32	2/5 sec.	1 1/3 sec.	4 sec.	8 sec.	1 min.	4 min.	10 min.	2 hours.
F/64	1½ sec.	5 sec.	16 sec.	32 sec.	4 min.	16 min.	40 min.	8 hours.

ENLARGEMENTS.

From the British Journal of Photography Almanac.

FOCUS OF LENS.	TIMES OF ENLARGEMENT AND REDUCTION.							
Inches.	1 Inch.	2 Inches.	3 Inches.	4 Inches.	5 Inches.	6 Inches.	7 Inches.	8 Inches.
2	4 4	6 3	8 2⅔	10 2½	12 2⅖	14 2⅓	16 2 2/7	18 2¼
2½	5 5	7½ 3¾	10 3⅓	12½ 3⅛	15 3	17½ 2 11/12	20 2 6/7	22½ 2 13/16
3	6 6	9 4½	12 4	15 3¾	18 3⅗	21 3½	24 3 3/7	27 3⅜
3½	7 7	10½ 5¼	14 4⅔	17½ 4⅜	21 4⅕	24½ 4 1/12	28 4	31½ 3 15/16
4	8 8	12 6	16 5⅓	20 5	24 4⅘	28 4⅔	32 4 4/7	36 4½
4½	9 9	13½ 6¾	18 6	22½ 5⅝	27 5⅖	31½ 5¼	36 5 1/7	40½ 5 1/16
5	10 10	15 7½	20 6⅔	25 6¼	30 6	35 5⅚	40 5 5/7	45 5⅝
5½	11 11	16½ 8¼	22 8⅓	27½ 6⅞	33 6⅗	38½ 6 5/12	44 6 2/7	49½ 6 3/16
6	12 12	18 9	24 8	30 7½	36 7⅕	42 7	48 6 6/7	54 6¾
7	14 14	21 10½	28 9⅓	35 8¾	42 8⅖	49 8⅙	56 8	63 7⅞
8	16 16	24 12	32 10⅔	40 10	48 9⅗	56 9⅓	64 9 1/7	72 9
9	18 18	27 13½	36 12	45 11¼	54 10⅘	63 10½	72 10 2/7	81 10⅛

The object of this table is to enable any manipulator who is about to enlarge (or reduce) a copy any given number of times, to do so without troublesome calculation. It is assumed that the photographer knows exactly what the focus of his lens is, and that he is able to measure accurately from its optical centre. The use of the table will be seen from the following illustration: A photographer has a *carte* to enlarge to four times its size, and the lens he intends employing is one of six inches equivalent focus. He must therefore, look for 4 on the upper horizontal line, and for 6 in the first vertical column, and carry his eye to where these two join, which will be at 30—7½. The greater of these is the distance the sensitive plate must be from the centre of the lens; and the lesser, the distance of the picture to be copied. To *reduce* a picture any given number of times the same method must be followed, but in this case the greater number will represent the distance between the lens and the picture to be copied; the latter, that between the lens and the sensitive plate. This explanation will be sufficient for every case of enlargement or reduction.

If the focus of the lens be twelve inches, as this number is not in the column of focal lengths, look out for 6 in this column and multiply by 2, and so on with any other numbers.

COMPARATIVE EXPOSURES FOR ENLARGING AND REDUCING.

Compiled by Mr. E. Ferrero, (Camera Club, London).

f/16	f/18	f/20	f/22	f/24	f/26	f/28	f/32	f/36	f/40	f/44	f/48	f/52
m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.
0 9	0 11	0 14	0 17	0 20	0 23	0 27	0 36	0 45	0 55	1 7	1 20	1 34
0 13	0 16	0 21	0 25	0 30	0 34	0 40	0 54	1 7	1 23	1 41	2 0	2 20
0 18	0 22	0 28	0 32	0 40	0 46	0 54	1 12	1 30	1 51	2 15	2 40	3 7
0 22	0 28	0 35	0 42	0 50	0 58	1 8	1 30	1 52	2 18	2 48	3 20	3 54
0 27	0 33	0 42	0 50	1 0	1 9	1 21	1 48	2 15	2 46	3 22	4 0	4 40
0 36	0 45	0 55	1 15	1 19	1 33	1 48	2 24	3 0	3 42	4 29	5 20	6 15
0 45	0 55	1 10	1 24	1 40	1 54	2 15	3 0	3 42	4 37	5 36	6 40	7 48
0 55	1 6	1 28	1 38	1 59	2 18	2 42	3 36	4 30	5 33	6 44	8 0	9 21
1 3	1 18	1 37	1 54	2 19	2 42	3 9	4 12	5 15	6 28	7 52	9 20	10 55
1 12	1 30	1 50	2 10	2 38	3 7	3 36	4 48	6 0	7 24	8 58	10 40	12 30
1 21	1 40	2 5	2 30	2 59	3 29	4 4	5 24	6 42	8 19	10 5	12 0	14 3
1 30	1 50	2 20	2 50	3 20	3 48	4 30	6 0	7 22	9 12	11 12	13 20	15 36
1 48	2 12	2 46	3 16	4 0	4 36	5 24	7 12	8 52	11 5	13 28	16 0	18 40
2 6	2 35	3 13	3 48	4 37	5 23	6 18	8 24	10 30	12 56	15 43	18 40	21 50
2 24	3 0	3 40	4 20	5 17	6 14	7 12	9 36	12 0	14 48	17 55	21 20	25 0
2 42	3 20	4 10	4 58	5 58	6 58	8 7	10 48	13 24	16 36	20 10	24 0	28 6
3 0	3 40	4 40	5 36	6 40	7 36	9 0	12 0	14 44	18 25	22 24	26 40	31 12
3 22	4 10	5 15	6 18	7 30	8 33	10 10	13 30	16 36	20 48	25 12	30 0	35 10
3 45	4 36	5 50	7 0	8 19	9 30	11 15	15 0	18 24	23 0	28 0	33 20	39 4
4 7	5 5	6 25	7 42	9 9	10 27	12 27	16 30	20 18	25 20	30 48	36 40	42 57
4 30	6 30	7 0	8 24	10 0	11 24	13 30	18 0	22 6	27 40	33 36	40 0	46 54

COMPARATIVE EXPOSURES FOR ENLARGING AND REDUCING—*Continued.*

f/56	f/60	f/64	f/68	f/72	f/76	f/80	f/84	f/88	f/92	f/96	f/100
m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.
1 48	2 5	2 22	2 40	3 0	3 20	3 42	4 4	4 28	4 54	5 20	5 47
2 42	3 7	3 33	4 0	4 30	5 0	5 38	6 6	6 42	7 21	8 0	8 40
3 37	4 10	4 44	5 20	6 0	6 40	7 24	8 9	8 57	9 48	10 40	11 33
4 30	5 17	5 55	6 40	7 30	8 21	9 15	10 9	11 12	12 17	13 20	14 27
5 25	6 15	7 5	8 0	9 0	10 1	11 6	12 12	13 25	14 42	16 0	17 20
7 12	8 20	9 28	10 40	12 0	13 22	14 48	16 17	17 54	19 36	21 20	23 7
9 0	10 34	11 50	13 22	15 0	16 42	18 30	20 21	22 23	24 33	26 40	28 54
10 50	12 30	14 10	16 1	18 0	20 2	22 12	24 25	26 50	29 24	32 0	34 40
12 40	14 34	16 33	18 42	21 0	23 23	25 54	28 30	31 19	34 18	37 20	40 27
14 24	16 48	18 55	21 22	24 0	26 43	29 36	32 33	35 48	39 12	43 40	46 15
16 12	18 45	21 18	24 3	27 0	30 3	33 18	36 38	40 17	44 10	48 0	52 0
18 0	21 8	23 40	26 44	30 0	33 24	37 0	40 42	44 46	48 56	53 20	57 48
21 40	24 58	28 21	32 0	36 0	40 5	44 24	48 50	53 40	58 48	64 0	69 0
25 20	29 7	33 6	37 23	42 0	46 45	51 48	57 0	62 39	69 0	74 40	81 0
28 48	33 17	37 50	42 43	48 0	53 27	59 12	65 7	71 36	78 0	85 0	92 0
32 36	37 30	42 35	48 5	54 0	60 6	66 36	73 15	80 20	88 0	96 0	104 0
36 0	42 17	47 20	53 28	60 0	66 47	74 0	81 24	89 0	98 0	106 0	116 0
40 48	46 50	53 15	60 20	67 27	75 8	83 15	91 31	100 0	110 0	120 0	130 0
45 0	52 50	59 10	66 40	74 55	83 30	92 30	101 38	111 0	122 0	133 0	144 0
49 51	58 13	65 5	73 30	82 25	91 0	101 45	111 45	124 0	135 0	146 0	159 0
54 0	63 26	71 0	80 0	89 55	100 10	111 0	122 6	134 0	147 0	160 0	174 0

DR. WOODMAN'S TABLE OF VIEW ANGLES.

DIVIDE THE BASE OF THE PLATE BY THE EQUIVALENT FOCUS OF THE LENS.

If the quotient is	The angle is	If the quotient is	The angle is	If the quotient is	The angle is
	Degrees.		Degrees.		Degrees.
.282	16	.748	41	1.3	66
.3	17	.768	42	1.32	67
.317	18	.788	43	1.36	68
.335	19	.808	44	1.375	69
.353	20	.828	45	1.4	70
.37	21	.849	46	1.427	71
.389	22	.87	47	1.45	72
.407	23	.89	48	1.48	73
.425	24	.911	49	1.5	74
.443	25	.933	50	1.53	75
.462	26	.854	51	1.56	76
.48	27	.975	52	1.59	77
.5	28	1.	53	1.62	78
.517	29	1.02	54	1.649	79
.536	30	1 041	55	1.678	80
.555	31	1.063	56	1.7	81
.573	32	1.086	57	1.739	82
.592	33	1.108	58	1.769	83
.611	34	1.132	59	1.8	84
.631	35	1.155	60	1.833	85
.65	36	1.178	61	1.865	86
.67	37	1.2	62	1.898	87
.689	38	1.225	63	1.931	88
.708	39	1.25	64	1.965	89
.728	40	1.274	65	2.	90

This table has been calculated for the use of those who wish to know the precise *angle of view* included by any particular lens on a given size of plate. Its mode of use will be easily seen by inspection.

SIZES OF DRY PLATES MADE IN FRANCE AND GERMANY.

6½ × 9 c. m.......	2.5 × 3.6 inches.	21 × 29 c. m.......	8.2 × 10.6 inches.
9 × 12 "	3.6 × 4.7 "	24 × 30 "	9.4 × 11.8 "
12 × 15 "	4.7 × 5.9 "	27 × 33 "	10.6 × 12.9 "
13 × 18 "	5.1 × 7.0 "	27 × 35 "	10.6 × 13.7 "
12 × 20 "	4.7 × 7.8 "	30 × 40 "	11.8 × 15.7 "
15 × 21 "	5.9 × 8.2 "	40 × 50 "	15.7 × 19.6 "
15 × 22 "	5.9 × 8.6 "	50 × 60 "	19 6 × 23.6 "
18 × 24 "	7.2 × 9.4 "		

SIZES OF DRY PLATES MADE IN ITALY.

9 × 12 c. m.......	3.6 × 4.9 inches.	21 × 29 c. m.......	8.2 × 10.6 inches.
12 × 16 "	4.7 × 6.3 "	24 × 30 "	9.4 × 11.8 "
12 × 18 "	4.7 × 7.2 "	29 × 33 "	10.6 × 12.0 "
13 × 18 "	5.1 × 7.0 "	30 × 36 "	11.8 × 14.1 "
12 × 20 "	4.7 × 7.8 "	40 × 50 "	15.7 × 19.6 "
18 × 24 "	7.0 × 9.4 "	50 × 60 "	19.6 × 23.6 "

EQUATIONS RELATING TO FOCI, ETC.

The following simple optical formulæ and calculations, worked out by Mr. J. A. C. Branfill, will prove useful in many branches of photography, especially where several lenses of varying foci are in constant use for a variety of purposes:

Let p = Principal focus.
F = Greater conjugate do.
f = Lesser do. do.
$D = F + f$ = distance of image from object.
r = Ratio of any dimension in original to the same dimension in copy (in case of reduction), or *vice versa* (in case of enlargement).
a = Effective diameter of diaphragm.
U. S. No. = "Uniform System" No. of do.
x = Comparative exposure required.

Then

$$p = D \times \frac{r}{(r+1)^2} = \frac{Ff}{D} = \frac{F}{r+1} = \frac{rf}{r+1}$$

$$F = p\,(r+1) = \frac{pf}{f-p} = rf = \frac{rD}{r+1}$$

$$f = p \times \frac{(r+1)}{r} = \frac{pF}{F-p} = \frac{D}{r+1} = \frac{F}{r}$$

$$D = p \times \frac{(r+1)^2}{r} = f\,(r+1) = p\left(2 + r + \frac{1}{r}\right)$$

$$r = \frac{F-p}{p} = \frac{p}{f-p} = \frac{F}{f}$$

$$\text{U. S. No.} = \frac{p^2}{16\,a^2}$$

$$x = \frac{f^2}{16\,a^2} = \frac{p^2}{16\,a^2} \times \frac{(r+1)^2}{r^2}$$

N. B.—For ordinary landscape work, where r is greater than 20, x may be taken as $\frac{p^2}{16\,a^2}$

NOTE.—In case the above may not be clear to some photographers, the following rules may be better understood:

To find the principal focus of a lens (p), focus a near object in the camera, and measure the distance between it and the ground-glass (D); next find the proportion which any dimension in the object bears to the same dimension on the ground-glass (r). Thus, if the original dimension be four times as large as its reproduction, we say that r equals (=) 4. Multiply D by r, and divide the product by the square of a number greater by one than r $(r+1)^2$. This rule was lately published by Mr. Debenham.

To find the lesser conjugate focus (f) (if p and r are known) multiply p by the sum of $r + 1$ and divide the product by r. Or divide D by $r + 1$.

To find the greater conjugate focus (F) multiply p by $r + 1$. Or multiply f by r.

To find D (the distance which the ground-glass should be from the object to be copied in order to get a given value for r) multiply p by the sum of $r + \frac{1}{r} + 2$.

To find r divide $F - p$ (the difference between F and p) by p. Or divide p by $f - p$. Or divide F by f.

To find x divide the square of f by 16 times the square of a (the diameter of aperture to lens).

For example: Focus an object which is five inches high, so that it is one inch high on the ground-glass; thus we know that $r = 5$. Next measure the distance between the object and the ground-glass (D), which is found to be 45 inches.

Then $p = 45 \times$ (multiplied by) $5 \div$ (divided by) $6 \times 6 = 6\tfrac{1}{4}$ inches.
$f = 5\tfrac{1}{4} \times 6 \div 5 = 7\tfrac{1}{2}$ inches. Or $f = 45 \div 6 = 7\tfrac{1}{2}$ inches.
$F = 6\tfrac{1}{4} \times 6 = 37\tfrac{1}{2}$ inches. Or $F = 7\tfrac{1}{2} \times 5 = 37\tfrac{1}{2}$ inches.
$D = 6\tfrac{1}{4} \times (5 + \tfrac{1}{5} + 2) = 6\tfrac{1}{4} \times 7\tfrac{1}{5} = 45$ inches.
$r = (37\tfrac{1}{2} - 6\tfrac{1}{4}) \div 6\tfrac{1}{4} = 5$. Or $r = 6\tfrac{1}{4} \div (7\tfrac{1}{2} - 6\tfrac{1}{4}) = 5$.

ELSDEN'S TABLE OF POISON AND ANTIDOTES.

	Poisons.	Remarks.	Characteristic Symptoms.	Antidotes.
Vegetable Acids....	OXALIC ACID............ including POTASSIUM OXALATE.	1 drachm is the smallest fatal dose known.	Hot burning sensation in throat and stomach; vomiting, cramps, and numbness	Chalk, whiting or magnesia suspended in water. Plaster or mortar can be used in emergency.
Caustic Alkalies....	AMMONIUM " ...... POTASSIUM " ...... SODIUM "	Vapor of ammonia may cause inflammation of the lungs.	Swelling of tongue, mouth and fauces; often followed by stricture of the œsophagus.	Vinegar and water.
Metallic Salts......	MERCURIC CHLORIDE......	3 grains the smallest known fatal dose.	Acid, metallic taste, constriction and burning in throat and stomach, followed by nausea and vomiting.	White and yolk of raw eggs with milk. In emergency, flour paste may be used.
	ACETATE OF LEAD.........	The sub-acetate is still more poisonous.	Constriction in the throat and at pit of stomach; crampy pains and stiffness of abdomen; blue line round the gums.	Sulphates of soda or magnesia. Emetic of sulphate of zinc.
	CYANIDE OF POTASSIUM...	*a.* Taken internally, 3 grs. fatal.	Insensibility, slow gasping respiration, dilated pupils and spasmodic closure of the jaws.	No certain remedy; cold affusion over the head and neck most efficacious.
		b. Applied to wounds and abrasures of the skin.	Smarting sensation.	Sulphate of iron should be applied immediately.
	BICHROMATE OF POTASSIUM	*a.* Taken internally. *b.* Applied to slight abrasions of the skin.	Irritant pain in stomach and vomiting. Produces troublesome sores and ulcers.	Emetics and magnesia, or chalk.
	NITRATE OF SILVER........		Powerful irritant.	Common salt to be given immediately, followed by emetics.
Concentrated Mineral Acids..	NITRIC ACID..............	2 drachms have been fatal. Inhalation of the fumes has also been fatal.	Corrosion of windpipe, and violent inflammation.	Bicarbonate of soda, or carbonate of magnesia or chalk; plaster of the apartment beaten up in water.
	HYDROCHLORIC ACID.......	½ ounce has caused death.		
	SULPHURIC ACID...........	1 drachm has been fatal.		

ACETIC ACID, concentrated, has as powerful an effect as the mineral acids.

	Poisons.	Remarks.	Characteristic Symptoms.	Antidotes.
	IODINE	Variable in its action; 3 grains have been fatal.	Acrid taste, tightness about the throat, vomiting.	Vomiting should be encouraged, and gruel, arrow-root and starch given freely.
	PYROGALLOL..............	2 grains sufficient to kill a dog.	Resemble phosphorus poisoning.	No certain remedy. Speedy emetic desirable.

SOLUBILITY OF CHLORIDE OF SILVER IN SOLUTIONS OF VARIOUS SALTS.

(*H. Hahn.*)

	Per Cent. of the Solution.	Saturated at	Per Cent. of Silver Chloride Dissolved.	Per Cent. of Silver.	Sp. Gr.	Temperature.	Number of Grams of Silver in 100 c. c.
Potassium chloride	24.95	19.6°	0.0776	0.0584	1.1774	19.6°	0.0688
Sodium "	25.96	"	0.1053	0.0793	1.2053	"	0.0956
Ammonium "	28.45	24.5°	0.3397	0.2551	1.0835	30.0°	0 2764
Calcium "	41.26	"	0.5713	4.4300	1.4012	"	0.6283
Magnesium "	36.35	"	0.5313	0.3999	1.3350	"	0.5339
Barium "	27.32	"	0.0570	0.0429	1.3017	"	0.0558
Ferrous "	30.70	—	0.1686	0.1269	1.4199	20.0°	0.1802
Ferric "	37.48	—	0.0058	0.0044	1.4472	21.4°	0.0064
Manganous "	43.85	24.5°	0.1996	0.1499	1.4851	30.0°	0.2226
Zinc "	53.34	—	0.0134	0.0101	1.6005	"	0.0162
Cuprous "	44.48	24.5°	0.0532	0.0399	1.5726	"	0.0627
Lead "	0.99	"	0.0000	0.0000	1.0094	"	0.0000

SOLUBILITY OF SILVER CHLORIDE IN SOLUTIONS OF SODIUM SULPHITE OF VARIOUS DEGREES OF CONCENTRATION.

(*W. de W. Abney.*)

Strength of Sodium Sulphite Solution.	Grams of Silver Chloride Dissolved per 100 c. c.
1.04 grams per 100 c. c. of water.	0.007
2.08 " " " "	0.020
4.16 " " " "	0.070
6.24 " " " "	0.110
8.35 " " " "	0.150
16.70 " " " "	0.310
20.83 " " " "	0.400

SOLUBILITY OF SILVER CHLORIDE IN SOLUTIONS OF SODIUM THIOSULPHATE OF VARIOUS DEGREES OF CONCENTRATION.

(*W. de W. Abney.*)

Strength of Sodium Thiosulphate Solution.	Grams of Silver Chloride Dissolved per 100 c. c.
2.08 grams per 100 c. c. of water.	0.29
4.16 " " " "	0.64
6.24 " " " "	0.88
8.35 " " " "	1.26
16.70 " " " "	2.54
20.83 " " " "	3.28

Engraved by
Gatchell & Manning,
Philadelphia, Pa.

By A. Langfier

PORTRAIT STUDY

EQUIVALENT WEIGHTS OF CERTAIN SILVER COMPOUNDS, ETC.

By A. H. Elliott, Ph.D.

One part of silver, or one part of silver nitrate, is equal to the following parts of other combinations:

	Silver Chloride.	Silver Bromide.	Silver Iodide.	Potassium Chloride.	Potassium Bromide.
Silver	1.328	1.740	2.176	.690	1.102
Silver Nitrate.	.844	1.106	1.382	.439	.701

	Potassium Iodide.	Sodium Chloride.	Sodium Bromide.	Sodium Iodide.	Ammonium Chloride.
Silver	1.538	.541	.953	1.388	.495
Silver Nitrate.	.971	.344	.606	.882	.315

	Ammonium Bromide.	Ammonium Iodide.	Cadmium Chloride.	Cadmium Bromide.	Cadmium Iodide.
Silver	.907	1.342	1.363	1.776	2.211
Silver Nitrate.	.576	.853	.538	.800	1.076

EQUIVALENT WEIGHTS OF CERTAIN GOLD COMPOUNDS.

(*Eder's Year Book of Photography.*)

Gold.	Gold Chloride (Anhyd.)	Gold Chloride (Crystallized.)	Double Chloride of Gold and Potassium.	Double Chloride of Gold and Sodium.	Double Chloride of Gold and Calcium.	Fizeau's Salt.
1	1.540	1.814	2.148	2.020	2.096	2.670
0.649	1	1.178	1.394	1.310	1.360	1.700
0.554	0.849	1	1.183	1.113	1.155	1.471
0.465	0.717	0.844	1	0.941	0.976	1.219
0.494	0.762	0.898	1.062	1	1.037	1.321
0.477	0.735	0.869	1.024	1.963	1	1.273
0.374	0.575	0.679	0.804	0.757	0.781	1

ACETIC ACID.

Quantities of crystallizable acid in mixtures of acetic acid and water of various densities at 15° C.

Parts of Crystallizable Acid in 100.	Specific Gravity.	Parts of Crystallizable Acid in 100.	Specific Gravity.	Parts of Crystallizable Acid in 100.	Specific Gravity.	Parts of Crystallizable Acid in 100.	Specific Gravity.
100	1.0553	75	1.0746	50	1.0615	25	1.0350
99	1.0580	74	1.0744	49	1.0607	24	1.0337
98	1.0604	73	1.0742	48	1.0598	23	1.0324
97	1.0625	72	1.0740	47	1.0589	22	1.0311
96	1.0644	71	1.0737	46	1.0580	21	1.0298
95	1.0660	70	1.0733	45	1.0571	20	1.0284
94	1.0674	69	1.0729	44	1.0562	19	1.0270
93	1.0686	68	1.0725	43	1.0552	18	1.0256
92	1.0696	67	1.0721	42	1.0543	17	1.0242
91	1.0705	66	1.0717	41	1.0533	16	1.0228
90	1.0713	65	1.0712	40	1.0523	15	1.0214
89	1.0720	64	1.0707	39	1.0513	14	1.0201
88	1.0726	63	1.0702	38	1.0502	13	1.0185
87	1.0731	62	1.0697	37	1.0492	12	1.0171
86	1.0736	61	1.0691	36	1.0481	11	1.0157
85	1.0739	60	1.0685	35	1.0470	10	1.0142
84	1.0742	59	1.0679	34	1.0459	9	1.0127
83	1.0744	58	1.0673	33	1.0447	8	1.0113
82	1.0746	57	1.0666	32	1.0436	7	1.0098
81	1.0747	56	1.0660	31	1.0424	6	1.0083
80	1.0748	55	1.0653	30	1.0412	5	1.0067
79	1.0748	54	1.0646	29	1.0400	4	1.0052
78	1.0748	53	1.0638	28	1.0388	3	1.0037
77	1.0748	52	1.0631	27	1.0375	2	1.0022
76	1.0747	51	1.0623	26	1.0363	1	1.0007

N. B.—The density of the mixture increases until nearly 25 % of water is present, after which it again decreases. Acetic acid is, therefore, better tested volumetrically with a standard solution of alkali.

SULPHUROUS ACID.

Quantities of anhydrous sulphurous acid in solutions of different densities.

(*F. Authon.*)

Specific Gravity.	Anhydrous Acid in 100.	Specific Gravity.	Anhydrous Acid in 100.	Specific Gravity.	Anhydrous Acid in 100.	Specific Gravity.	Anhydrous Acid in 100.
1.046	9.54	1.027	6.68	1.020	4.77	1.013	2.86
1.036	8.59	1.023	5.72	1.016	3.82	1.009	1.90
1.031	7.63					1.005	0.95

DENSITIES OF WATER SOLUTIONS OF ALBUMEN AT 15.5° CELSIUS.

(*Eder's Year Book of Photography.*)

Per Cent. Albumen.	° Bé.	Sp. Gr.	Per Cent. Albumen.	° Bé.	Sp. Gr.	Per Cent. Albumen.	° Bé.	Sp. Gr.
1	0.37	1.0026	15	5.32	1.0384	40	13.78	1.1058
2	0.77	1.0054	20	7.06	1.0515	45	15.48	1.1204
3	1.12	1.0078	25	8.72	1.0644	50	17.16	1.1352
5	1.85	1.0130	30	10 42	1.0780	55	18.90	1.1511
10	3.66	1.0261	35	12.12	1.0919			

DENSITIES OF VARIOUS MIXTURES OF ALCOHOL AND ETHER AT 15° CELSIUS.

(*Eder's Year Book of Photography.*)

Per Cent. Alcohol 0.809 Sp. Gr.	Sp. Gr.	Per Cent. Alcohol 0.809 Sp. Gr.	Sp. Gr.
0	0.729	60	0.779
10	0.737	70	0.786
20	0.747	80	0.798
30	0.756	90	0.801
40	0.765	100	0.809
50	0.772		

DENSITIES OF WATER SOLUTIONS OF CUPRIC CHLORIDE AT 17.5° CELSIUS.

(*Franz.*)

Sp. Gr.	Per Cent. $Cu\,Cl_2$.	Sp. Gr.	Per Cent. $Cu\,Cl_2$.	Sp. Gr.	Per. Cent. $Cu\,Cl_2$.
1.0182	2	1.1696	16	1.3618	30
1.0364	4	1.1958	18	1.3950	32
1.0548	6	1.2228	20	1.4287	34
1.0784	8	1.2501	22	1.4615	36
1.0920	10	1.2779	24	1.4949	38
1.0178	12	1.3058	26	1.5284	40
1.1486	14	1.3338	28		

DENSITIES OF WATER SOLUTIONS OF FERRIC CHLORIDE AT 17.5° CELSIUS.

(*Franz.*)

Sp. Gr.	Per Cent. Fe_2Cl_6.	Sp. Gr.	Per Cent. Fe_2Cl_6.	Sp. Gr.	Per Cent. Fe_2Cl_6.
1.0146	2	1.1746	22	1.3870	42
1.0292	4	1.1950	24	1.4118	44
1.0439	6	1.2155	26	1.4367	46
1.0587	8	1.2365	28	1.4617	48
1.0734	10	1.2568	30	1.4867	50
1.0894	12	1.2778	32	1.5153	52
1.1054	14	1.2988	34	1.5439	54
1.1215	16	1.3199	36	1.5729	56
1.1378	18	1.3411	38	1.6023	58
1.1542	20	1.3622	40	1.6317	60

DENSITIES OF WATER SOLUTIONS OF SILVER NITRATE AT 16° CELSIUS.

(*Dawson.*)

°Tw.	°Bé.	Sp. Gr.	Per Cent. $AgNO_3$.	°Tw.	°Bé.	Sp. Gr.	Per Cent. $AgNO_3$.	°Tw.	°Bé.	Sp. Gr.	Per Cent. $AgNO_3$.
4	2.7	1.021	2.08	19	12.4	1.097	10.41	34	20.9	1.172	18.75
8	5.4	1.040	4.16	23	14.9	1.116	12.50	38	23.0	1.191	20.83
12	8.0	1.059	6.24	27	17.1	1.135	14.58	42	25.0	1.209	22.91
16	10.6	1.078	8.35	30	18.8	1.152	16.66	45	26.4	1.227	25.00

DENSITIES OF WATER SOLUTIONS OF CHROME ALUM.

(*Franz.*)

Sp. Gr.	Per Cent.	Sp. Gr.	Per Cent.
1.0174	5	1.1896	40
1.0342	10	1.2894	50
1.0746	20	1.4566	60
1.1274	30	1.6362	70

DENSITIES OF WATER SOLUTIONS OF CERTAIN ALKALINE IODIDES AT 20° CELSIUS.

(*Gerlach.*)

Per Cent.	Potassium Iodide.	Lithium Iodide.	Sodium Iodide.	Barium Iodide.	Calcium Iodide.	Strontium Iodide.	Magnesium Iodide.
5	1.038	1.038	1.040	1.045	1.044	1.045	1.043
10	1.078	1.079	1.082	1.091	1.090	1.091	1.088
15	1.120	1.124	1.128	1.143	1.140	1.142	1.139
20	1.166	1.172	1.179	1.201	1.198	1.200	1.194
25	1.218	1.224	1.234	1.265	1.260	1.262	1.254
30	1.271	1 280	1.294	1.333	1.321	1.330	1.320
35	1.331	1.344	1.360	1.412	1.398	1.410	1.395
40	1.396	1.414	1.432	1.495	1.477	1.491	1.474
45	1.469	1.489	1.510	1.596	1.567	1.590	1.558
50	1.546	1.575	1.600	1.704	1.665	1.695	1.688
55	1.636	1.670	1.700	1.825	1.780	1.812	1.780
60	1.734	1.777	1.810	1.970	1.910	1.955	1.915
65						2.150	

DENSITIES OF WATER SOLUTIONS OF SODIUM CHLORIDE AT 20° CELSIUS.

(*Schiff.*)

Per Cent.	°Tw.	°Bé.	Sp. Gr.	Per Cent.	°Tw.	°Bé.	Sp. Gr.	Per Cent.	°Tw.	°Bé.	Sp. Gr.	Per Cent.	°Tw.	°Bé.	Sp. Gr.	Per Cent.	°Tw.	°Bé.	Sp. Gr.
1	1	0.7	1.0066	7	10	6.7	1.0483	13	19	12.4	1.0934	19	28	17.7	1.1408	25	38	23.0	1.1906
2	3	2.1	1.0133	8	11	7.4	1.0556	14	20	13.0	1.1012	20	30	18.8	1.1490	26	40	24.0	1.1990
3	4	2.7	1.0201	9	13	8.7	1.0630	15	22	14.2	1.1090	21	31	19.3	1.1572	27	41	24.5	1.2075
4	5	3.4	1.0270	10	14	9.4	1.0705	16	23	14.9	1.1168	22	33	20.3	1.1655	..	..	..	...
5	7	4.7	1.0340	11	16	10.6	1.0781	17	25	16.0	1.1247	23	35	21.4	1.1738	..	..	..	...
6	8	5.4	1.0411	12	17	11.2	1.0857	18	27	17.1	1.1327	24	36	22.0	1.1822	..	..	..	...

DENSITIES OF WATER SOLUTIONS OF AMMONIA AT 14° CELSIUS.

(*Carius.*)

Specific Gravity.	Percentage of Ammonia.	Specific Gravity.	Percentage of Ammonia.
0.8844	36.0	0.9314	18.0
0.8864	35.0	0.9347	17.0
0.8885	34,0	0.9380	16.0
0.8907	33.0	0.9414	15.0
0.8929	32.0	0.9449	14.0
0.8953	31.0	0.9484	13.0
0.8976	30.0	0.9520	12.0
0.9001	29.0	0.9556	11.0
0.9026	28.0	0.9593	10.0
0.9052	27.0	0.9631	9.0
0.9078	26.0	0.9670	8.0
0.9106	25.0	0.9709	7.0
0.9133	24.0	0.9749	6.0
0.9162	23.0	0.9790	5.0
0.9191	22.0	0.9831	4.0
0.9221	21.0	0.9873	3.0
0.9251	20.0	0.9915	2.0
0.9283	19.0	0.9959	1.0

DENSITIES OF SODIUM CARBONATE SOLUTIONS.

By Arthur H. Elliott, Ph. D.

Based upon the specific gravity table of Schiff in *Chemiker Kalender*. Temperature 23° C. (73° F.). The gallon is that of the United States, and contains 133.28 ounces of water. The ounce contains 437.5 grains. The first four columns give percentage by weight and weight in 100 volumes of the crystals (10 molecules water) and dry salt respectively.

Grams of Crystals in 100 grms.	Grams of Crystals in 100 c. c.	Grams of Dry Salt in 100 grms.	Grams of Dry Salt in 100 c. c.	Ounces Crystals in one gallon.	Grains Crystals in one fluid ounce.	Specific Gravity.	Degree Beaume.	Degree Twaddell.
50	60.2	18.53	22.31	80	262.5	1.204	24	40
45	53.2	16.67	19.75	71	232.	1.183	23	38
40	46.5	14.82	17.30	62	203.	1.162	20	32
35	40.0	12.97	14.83	53	174.5	1.141	18	28
30	33.6	11.12	12.32	45	147.	1.120	16	24
25	27.5	9.26	10.23	37	110.	1.099	13	20
20	21.6	7.41	8.00	29	94.5	1.079	10.5	16
15	15.9	5.56	5.83	21	69.5	1.059	8	12
10	10.4	3.70	3.85	14	45.5	1.039	5.4	8
5	5.1	1.85	1.86	7	22.3	1.019	2.7	4
2	2.0	.74	.76	3	8.8	1.008	1	1.4

DENSITIES OF POTASSIUM CARBONATE SOLUTIONS.

By Arthur H. Elliott, Ph. D.

Based upon the specific gravity table of Gerlach in *Chemiker Kalender*. Temperature 15° C. (60° F.). The gallon is that of the United States, and contains 133.28 ounces of water. The ounce contains 437.5 grains. Dry potassium carbonate is understood in the figures given, and the first two columns give percentages by weight and weight in 100 volumes.

Grams in 100 grams.	Grams in 100 c. c.	Ounces in one gallon.	Grains in one fl. oz.	Specific Gravity.	Degree Beaume.	Degree Twaddell.
52	81.6	109.	357	1.570	53	114
50	77.2	103.	338	1.544	51	108
45	66.6	89.	291	1.480	47	96
40	56.7	76.	248	1.419	43	84
35	47.5	63.	208	1.359	38	72
30	39.0	52.	171	1.301	33	58
25	31.1	41.5	137	1.246	29	51
20	23.8	32.	105	1.193	24	40
15	17.1	23.	75	1.142	18	28
10	10.9	14.5	44	1.093	12	18
5	5.2	7.	23	1.046	7	10
2	2.0	2.7	9	1.018	2.5	3

DENSITIES OF SATURATED SOLUTIONS.

The following solutions are saturated at 60° F. and the table gives the specific gravity, degrees Beaume and Twaddell, and the percentage of salt *by weight*.

	Specific Gravity.	Degree Beaume.	Degree Twaddell.	Percentage of Salt by Weight.
Alum (Ammonia) Crystallized........	1.048	7	10	11
Potassium Carbonate Dry............	1.571	52	112	52
" Oxalate	1.262	30	52	25
Sodium Carbonate (10 molecules water)	1.199	24	40	49
" Hyposulphite (5 " ")	1.210	25	41	58
" Sulphite (7 " ")	1.197	24	40	35

DENSITIES OF SODIUM SULPHITE SOLUTIONS.

By Arthur H. Elliott, Ph. D.

Based upon experiments made specially for the construction of this table, temperature 15° C. (60° F.). The gallon is that of the United States, and contains 133.28 ounces of water; the ounce contains 437.5 grains of water. Crystallized sodium sulphite with seven molecules of water is understood in the figures given, and the first two columns give percentage by weight and weight in 100 volumes.

Grams in 100 grams.	Grams in 100 c. c.	Ounces in one gallon.	Grains in one fl. oz.	Specific Gravity.	Degree Beaume.	Degree Twaddell.
35.1	42.0	54.2	184	1.1969	24	40
30	35.0	46.6	153	1.1675	21	34
25	28.5	38.0	122	1.1381	17	27
20	22.2	29.6	97	1.1087	11	17
15	16.2	21.6	61	1.0793	10.5	15
10	10.5	14.0	46	1.0499	7.0	10
5	5.1	6.8	22.3	1.0205	3.0	4
2	2.0	2.7	8.8	1.0100	2.0	2

DENSITIES OF HOT SOLUTIONS FOR OBTAINING CRYSTALS OF THE FOLLOWING SUBSTANCES ON COOLING.

Substance.	°Bé.	Substance.	°Bé.
Acetate of Lead	42	Chloride of Calcium	40
" " Sodium	22	" " Copper	45
Oxalic Acid	12	" " Magnesium	35
Ammonia Alum	20	" " Potassium	25
Potash "	20	Bichromate of Ammonia	28
Nitrate of Lead	50	" " Potash	33
" " Potash	28	Chromate of Sodium	45
" " Soda	40	Hyposulphite of Sodium	3
Barium Hydrate	12	Iodide of Potassium	60
Borax	24	Oxalate of "	30
Bromide of Ammonium	30	Permanganate of Potassium	25
" " Cadmium	65	Phosphate of Soda	20
" " Potassium	40	Sulphate of Copper	30
" " Sodium	55	" " Iron (Copperas)	31
" " Strontium	50	" " Zinc	45
Carbonate of Sodium	28	Sulphite of Soda	25
Chlorate of Potash	22	Sulphocyanide of Ammonia	18
" " Sodium	43	Neutral Tartrate of Potash	33
Chloride of Ammonium	12	Rochelle Salts	38
" " Barium	35		

Engraved by
Baltimore Engraving Co.,
Baltimore, Md.

By W. N. Brenner

DENSITIES OF WATER SOLUTIONS OF POTASH OR AMMONIA ALUM AT 17.5° CELSIUS.

(*Eder's Year Book of Photography.*)

Sp. Gr. of $K_2Al_2(SO_4)_4+24Aq$. Solution.	Sp. Gr. of $(NH_4)_2Al_2(SO_4)_4+24Aq$. Solution.	Per Cent.
1.0065	1.0060	1
1.0110	1.0109	2
1.0166	1.0156	3
1.0218	1.0200	4
1.0269	1.0255	5
1.0320	1.0305	6

DENSITIES OF WATER SOLUTIONS OF SULPHUROUS ACID AT 15° CELSIUS.

(*Scott.*)

Sp. Gr.	Per Cent. SO_2.	Sp. Gr.	Per Cent. SO_2.
1.0028	0.5	1.0302	5.5
1.0056	1.0	1.0328	6.0
1.0085	1.5	1.0353	6.5
1.0113	2.0	1.0377	7.0
1.0141	2.5	1.0401	7.5
1.0168	3.0	1.0426	8.0
1.0194	3.5	1.0450	8.5
1.0221	4.0	1.0474	9.0
1.0248	4.5	1.0497	9.5
1.0275	5.0	1.0520	10.0

DENSITIES OF WATER SOLUTIONS OF SODIUM HYDRATE AT 15° CELSIUS.

(*Eder's Year Book of Photography.*)

°Tw.	°Bé.	Sp. Gr.	Per Cent. NaOH.	°Tw.	°Bé	Sp. Gr.	Per Cent. NaOH.
2	1.4	1.012	1	34	20.9	1.170	15
5	3.4	1.023	2	45	26.4	1.225	20
7	4.7	1.035	3	56	31.5	1.279	25
9	6.0	1.046	4	66	35.8	1.332	30
12	8.0	1.059	5	77	40.1	1.384	35
14	9.4	1.070	6	87	43.8	1.437	40
16	10.6	1.081	7	98	47.4	1.488	45
18	11.9	1.092	8	108	50.6	1.540	50
21	13.6	1.103	9	118	53.6	1.591	55
23	14.9	1.115	10	129	56.6	1.643	60

DENSITIES OF WATER SOLUTIONS OF SODIUM THIOSULPHATE AT 20° CELSIUS.

(*Schiff.*)

°Tw.	°Bé.	Sp. Gr.	Per Cent. $Na_2S_2O_3+5Aq.$	Per Cent. $Na_2S_2O_3$.	°Tw.	°Bé.	Sp. Gr.	Per Cent. $Na_2S_2O_3+5Aq.$	Per Cent. $Na_2S_2O_3$.
5	3.4	1.0264	5	3.185	33	20.3	1.1676	30	19.113
11	7.4	1.0529	10	6.371	40	24.0	1.1986	35	22.298
16	10.6	1.0807	15	9.556	46	26.9	1.2297	40	25.484
22	14.2	1.1087	20	12.742	53	29.7	1.2624	45	28.669
28	17.7	1.1381	25	15.927	59	32.8	1.2954	50	31.855

DENSITIES OF WATER SOLUTIONS OF CERTAIN ALKALINE BROMIDES AT 20° CELSIUS.

(*Gerlach.*)

Per. Cent.	Potassium Bromide.	Lithium Bromide.	Sodium Bromide.	Barium Bromide.	Calcium Bromide.	Strontium Bromide.	Magnesium Bromide.
5	1.037	1.035	1.040	1.045	1.044	1.046	1.043
10	1.075	1.072	1.080	1.092	1.089	1.094	1.087
15	1.116	1.113	1.125	1.144	1.139	1.146	1.137
20	1.159	1.156	1.174	1.201	1.194	1.204	1.191
25	1.207	1.204	1.226	1.262	1.252	1.266	1.247
30	1.256	1.254	1.281	1.329	1.315	1.332	1.310
35	1.309	1.309	1.344	1.405	1.385	1.410	1.377
40	1.366	1.368	1.410	1.485	1.461	1.492	1.451
45	1.430	1.432	1.483	1.580	1.549	1.590	1.535
50		1.500	1.565	1.685	1.641	1.694	1.625
55		1.580		1.800			

Artistic Designing and Illustrating

NATIONAL PHOTO ENGRAVING COMPANY

Photo-Engraving, Half-tone Engraving, Photo-Electrotyping

16-18 READE ST., NEW YORK.

TELEPHONE 1822 FRANKLIN.

AMATEUR PHOTOGRAPHERS DO YOU KNOW

TRADE BOFLAY MARK

Registered

The Combined Automatic Developing and Fixing Solution will develop and fix your Plates or Films automatically, perfectly, without watching, and will stop the development at the proper time and then fix it, making over or under development impossible; all done in the one solution and one tray.

No more excuse for poorly developed PLATES or FILMS if you use "BOFLAY" and your exposure is anywhere within reason.

For sale at all first-class dealers. Sample by mail on receipt of 15 cents. Send for Pamphlet Y.

MANUFACTURED ONLY BY

The Boflay Camera & Chemical Co.,

NEWARK, N. J., U. S. A.

NECESSITY, THE MOTHER OF INVENTION.

TRADE BOFLAY MARK

Registered

No. "2."

The New Combined Automatic Developing and Fixing Solution for "Velox" or other gas-light paper will Develop and Fix your paper *Absolutely Automatically* in the *One Solution* and one tray.

Over development impossible, as "BOFLAY" No. 2 will *Slowly Develop* your paper, stopping the development at the proper time and then fixing it automatically, giving *Pure Whites* and *Jet Blacks*, at the same time preserving the *Delicate Details*.

Any number of prints can be developed at one time, as they require no watching.

At all first-class dealers. Sample by mail on receipt of 15 cents. Send for Pamphlet Y.

MANUFACTURED ONLY BY

The Boflay Camera & Chemical Co.,

NEWARK, N. J., U. S. A.

Buffalo, N. Y.

Successor to the old firm of BUTTS & ADAMS.

Any one acquainted with the Photo-Supply business knows that the leading house in Buffalo is conducted by

J. F. Adams.

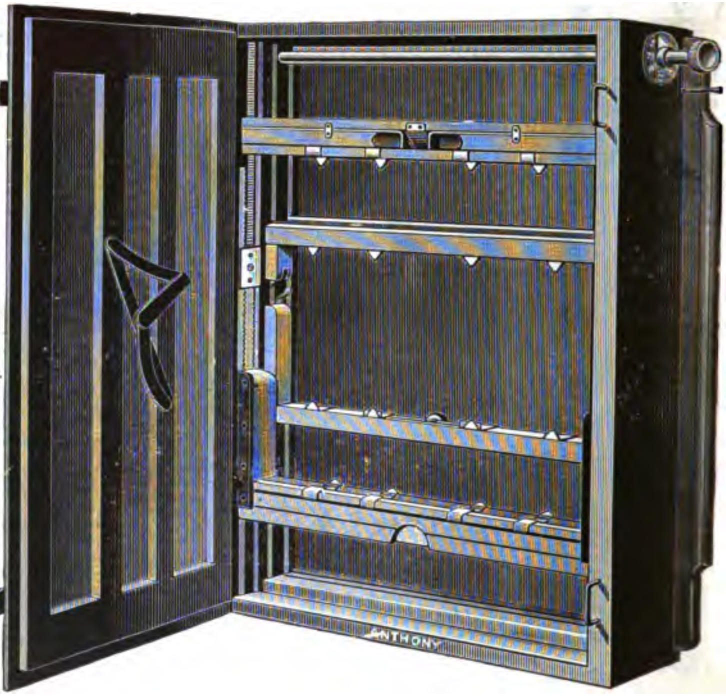
J. F. ADAMS, 459 Washington Street.

Anthony's Patent Lined Screen Holder

CONSTRUCTED ON THE BENSTER PRINCIPLE

Holds any size of plate or screen, and distance between plate or screen may be regulated from the outside of the Holder.

The Most Perfect Lined Screen Holder Made



The Most Perfect Lined Screen Holder Made

PRICES

ANTHONY'S PATENT LINED SCREEN HOLDER

		Ground Glass and Frame	Frame only for Ground Glass
8 x 10	$25.00	$3.00	$1.50
10 x 12	32.00	3.25	1.50
11 x 14	40.00	3.50	1.88
14 x 17	44 00	4.00	2.25
17 x 20	48.00	4.50	2.63
18 x 22	52.50	5.50	2.63
20 x 24	59.00	6.50	3.00

O. I. C. COPYING CAMERAS

	With Benster Holder.	With Lined Screen Holder.
8 x 10	$33.00	$48.00
10 x 12	42.00	58.00
11 x 14	52.00	71.00
14 x 17	65.00	85.00
17 x 20	$72.00	$92.50
18 x 22	85.00	107.50
20 x 24	98.00	122.00

COPYING, ENLARGING AND REDUCING CAMERAS

	With Benster Holder.	With Lined Screen Holder.
8 x 10	$38.00	$53.00
10 x 12	54.00	70.00
11 x 14	65.00	84.00
14 x 17	84.00	103.00
17 x 20	$100.00	$120.50
18 x 22	110.00	132.50
20 x 24	124.00	148.00

E. & H. T. Anthony & Co., 122-124 Fifth Avenue, 17th and 18th Streets, New York

PRICE LIST

Anthony's Cross Line Screens.

EACH PLATE IS AN ORIGINAL RULING.

Revised January 1, 1899. **Supersedes all Previous Lists.**

Sizes in Inches.	Lines per Inch.						
	75, 80 or 85.	100.	110 or 120.	125 or 133.	140 or 150.	160 or 175.	200.
6 x 8	$15 00	$18 00	$20 00	$22 00	$26 00	$32 00	$40 00
6½ x 8½.......	18 00	20 00	24 00	28 00	32 00	40 00	50 00
7 x 9	24 00	25 00	30 00	36 00	42 00	50 00	65 00
8 x 10	32 00	35 00	42 00	48 00	54 00	68 00	82 00
10 x 12	40 00	52 00	70 00	80 00	95 00	110 00	130 00
11 x 14	60 00	80 00	98 00	115 00	135 00	160 00	185 00
12 x 15	75 00	100 00	120 00	142 00	170 00	200 00	230 00
13 x 16	95 00	122 00	144 00	172 00	208 00	240 00	280 00
14 x 17	115 00	145 00	168 00	208 00	252 00	280 00	340 00
16 x 20	166 00	208 00	240 00	305 00	360 00	420 00	500 00
20 x 20	205 00	260 00	300 00	380 00	450 00		

TRIAL SIZES.

Sizes in Inches.	Lines per Inch.						
	75, 80 or 85.	100.	110 or 120.	125 or 133.	140 or 150.	160 or 175.	200.
3¼ x 4¼	$2 00	$2 00	$2 00	$2 00	$3 00	$5 00	$8 00
4 x 5	4 00	4 00	4 00	4 00	6 00	8 00	12 00
4¼ x 6½	6 00	6 00	6 00	6 00	8 00	10 00	16 00
5 x 7	9 00	9 00	10 00	12 00	14 00	16 00	22 00
5 x 8	12 00	12 00	12 00	14 00	16 00	20 00	28 00

For single-ruled screens, 33⅓ per cent. less.
Special quotations on larger sizes and different rulings.

E. & H. T. ANTHONY & CO.,

122 & 124 Fifth Avenue, 17th and 18th Streets, NEW YORK.

M. AMES, Manufacturer of LUNAR CAUSTIC,

NITRATE OF SILVER AND CHLORIDE OF GOLD,

And Refiner of GOLD AND SILVER WASTE.

I am furnishing the principal Dry Plate, Mirror and Chemical Manufacturers with my products, which is a guarantee of their purity. Correspondence solicited.

21 Sherman Avenue, Glens Falls, N. Y.

Wynne's Infallible Exposure Meter

Is the SIMPLEST and most compact device for the correct timing of exposures ever produced. By its use the most difficult subjects, with the widest possible differences in lighting, may be perfectly timed.

It is in Great Demand, and a Good Seller.

PRICE:	In Handsome Solid Nickel Case	$2.75
	In Locket Size, Silver	4.50
	In Locket Size, 14-Karat Rolled Gold	6.50

Extra Tins Sensitized Paper, 25 Cents.
Extra Dials and Glasses, 50 Cents.

E. & H. T. ANTHONY & CO., NEW YORK.

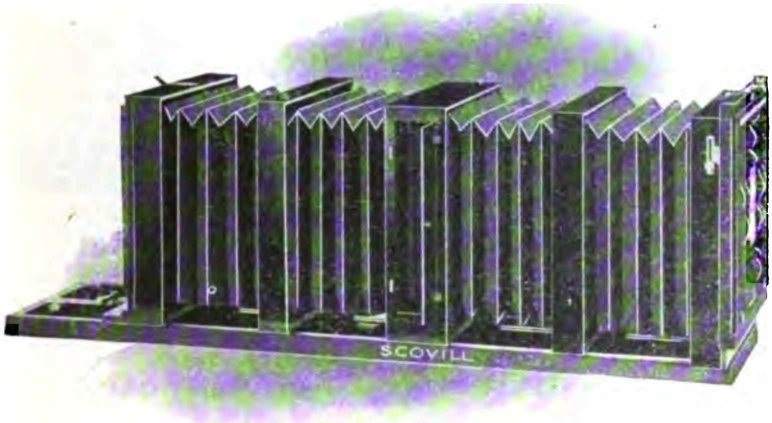
Photo-Engravers'

Cameras and Holders.

Scovill-Levy Screen Plate Holder.

The American Optical Company's Copying, Enlarging, and Reducing Cameras have always occupied a unique position. Long before the advent of the photo-engraving process, the photographers were all of one opinion as to the unapproachable quality of the Scovill A. O. Company's Copying Cameras. When the photographer branched out in

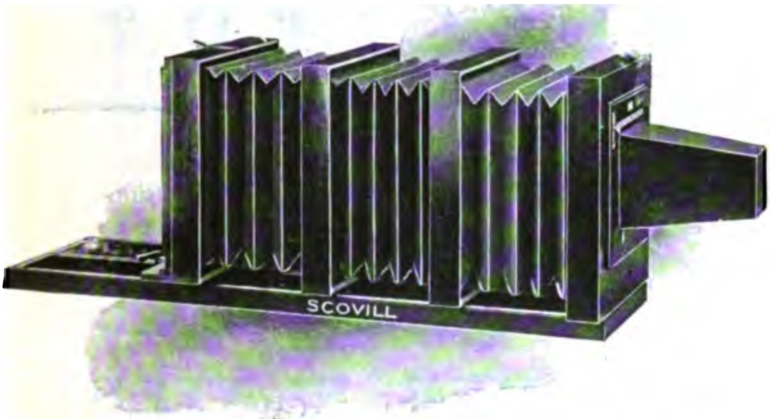
Scovill Cameras.



Scovill Enlarging, Reducing, and Copying Cameras.

the direction of photo-engraving, all his serious work and experimenting was done with Scovill Cameras; hence the reason why the outcome and result of his experience was made a part of the Scovill Cameras. One worker would write the Scovill factory, making a suggestion as to the construction of the lens front, another as to the focusing adjustment, still another as to the screen adjustment, each in the particular line of his observations, so that the sum total of practical suggestions representing years of experience was crystallized by our expert mechanics into what is known as the

Scovill Copying Cameras.



PRICES.

American Optical Co.'s Copying and E. R. & C. Cameras and Scovill-Levy Screen Holders.

AMERICAN OPTICAL COPYING CAMERAS.

	With Bonanza Holder.	*With Scovill-Levy Screen Holder.*		*With Bonanza Holder.*	*With Scovill-Levy Screen Holder.*
8 x 10	$33.00	$48.00	17 x 20	$72.00	$92.50
10 x 12	42.00	58.00	18 x 22	85.00	107.50
11 x 14	52.00	71.00	20 x 24	98.00	122.00
14 x 17	65.00	85.00			

ENLARGING, REDUCING, AND COPYING CAMERAS.

	With Bonanza Holder.	*With Scovill-Levy Screen Holder.*		*With Bonanza Holder.*	*With Scovill-Levy Screen Holder.*
8 x 10	$38.00	$53.00	17 x 20	$100.co	$120.50
10 x 12	54.00	70.00	18 x 22	110.00	132.50
11 x 14	65.00	84.00	20 x 24	124.00	148.00
14 x 17	84.00	103.00			

SCOVILL-LEVY PHOTO-ENGRAVERS' ADJUSTABLE SCREEN HOLDERS.

8 x 10	$25.00	17 x 20	$48.00
10 x 12	32.00	18 x 22	52.50
11 x 14	40.00	20 x 24	59.00
14 x 17	44.00		

GILT EDGE
FERRO-PRUSSIATE PAPER

GUARANTEED FOR ONE YEAR

Is coated upon stock that is equal to the best used in the manufacture of Albumen Paper

IT IS ABSOLUTELY CLEAN & FREE FROM SPOTS

And works with great rapidity and brilliancy

PRINT IN SUNLIGHT AND WASH IN WATER

No toning or development required.

2½ x 2½	inches,	in light-tight	boxes of	2	dozen,	per box	....$0.16
3¼ x 3¼	"	"	"	2	"	"	.... .16
3¼ x 4¼	"	"	"	2	"	"	.... .16
4 x 5	"	"	"	2	"	"	.... .20
4¼ x 6½	"	"	"	2	"	"	.... .30
5 x 7	"	"	"	2	"	"	.... .35
5 x 8	"	"	"	2	"	"	.... .40
6½ x 8½	"	"	"	2	"	"	.... .56
8 x 10	"	"	"	2	"	"	.... .68
18 x 24	"	per sheet, 18 cents; per dozen					.... 1.50

To save loss, boxes are not broken.

E. & H. T. ANTHONY & CO., 122-124 FIFTH AVE., NEW YORK.

VIGNETTED PRINTS ARE EASILY OBTAINED BY USE OF

The Dixie

Vignetter

Practical, cheap, simple and durable. It is attached to the ordinary printing frame, and can be quickly, easily and accurately adjusted to any negative. The pear, oval, round, square, or any desired opening can be produced, of any size required, and right where it is wanted.

The Dixie Vignetter is all complete. No separate parts to cost extra and get mislaid or broken, and it is always ready for use. It costs but a trifle, and should be a part of every outfit.

Size.	Each.	Per Doz.	Size.	Each.	Per Doz.
3¼ x 4¼	$0 30	3 50	5 x 8	$0 30	$3 50
4 x 5	30	3 50	6½ x 8½	45	5 00
4¼ x 6½	30	3 50	8 x 10	60	7 00
5 x 7	30	3 50	10 x 12	75	9 00

E. & H. T. ANTHONY & CO., 122-124 Fifth Avenue, NEW YORK.

FACTORY OF THE

A. M. COLLINS MANUFACTURING COMPANY.

OFFICES: No. 527 ARCH ST., PHILADELPHIA.

MANUFACTURERS OF CARD MOUNTS FOR BOTH PROFESSIONAL AND AMATEUR PHOTOGRAPHERS.

THEIR PRODUCTS SOLD BY ALL DEALERS N PHOTOGRAPHIC SUPPLIES THROUGHOUT THE UN TED STATES.

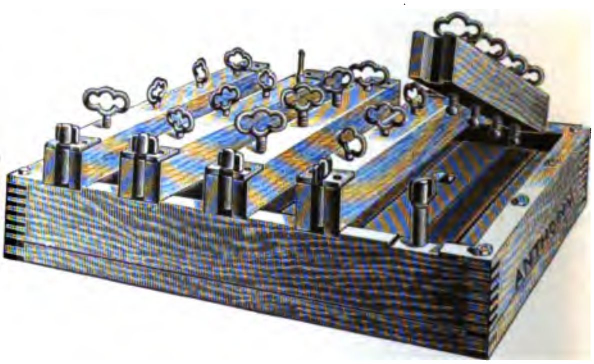
Anthony's Process Printing Frames

Are an improvement over the old heavy Process Printing Frame, made of **BEST MATERIAL, WITH STRONG IRON PRESSURE SCREWS, HEAVY TOP AND IRON STRIPS FOR SCREW BEARINGS, BOLTS EXTENDING THROUGH THE WOOD-WORK,** with hinges and clutches as strong as iron can make them. This frame insures **PERFECT DISTRIBUTION OF PRESSURE,** and is to be depended upon in all particulars.

PRICE:

Including one inch glass

SIZE.	PRICE.
9 x 11	$10 50
11 x 13	12 00
12 x 15	14 00
15 x 18	18 00
17 x 21	24 00
18 x 21	25 00
19 x 23	27 50
21 x 25	32 50
23 x 29	37 50

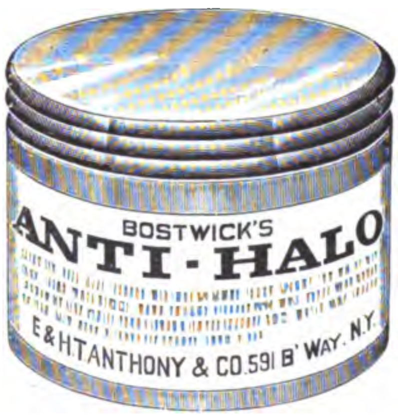


Estimates Promptly Furnished on all Supplies

E. & H. T. ANTHONY & CO., NEW YORK

Back Your Plates with

Anti-Halo



and so prevent

HALATION.

Anti-Halo is easily applied, easily removed, and will NOT SCRATCH OFF.

Try Anti-Halo on Your Favorite Plate.

Size No. 1 . . . . 60 Cents.
Size No. 2 . . . . One Dollar.

By Mail, Ten Cents Extra.

FOR SALE BY ALL DEALERS.

Do your own Developing ... and Printing E. A. DEVELOPING and PRINTING OUTFITS

Are prepared with special reference to use with the smaller Hand Cameras, and comprise the following assortment of trays, chemicals, etc.:

One lamp three developing trays, one two-ounce measuring glass, one printing frame and glass, half dozen developing powders, one pound hyposulphite soda, one dozen sheets ferro-prussiate paper, one dozen Rex card mounts, one paste tube, one package bromide of potassium, instruction book. All packed in paper box.

Price for 2½ x 2½ plates.........$1.50 *Price for 3¼ x 4¼ plates $1.50*
Price for 3¼ x 3¼ plates......... 1.50 *Price for 3½ x 3½ plates......... 1.50*
Price for 4 x 5 plates.... ....$1.50

E. & H. T. Anthony & Co., 122-124 Fifth Ave., New York

FERDINAND FLINSCH

Machinery Making and Iron Founding Company, Limited

OFFENBACH-ON-MAIN (GERMANY).

Machines for photographic papers, **CITRATE** (chloride), **BROMIDE** and **COLLODION** papers, for **COATING DRY PLATES** and **FOR WASHING THE GLASS PLATES.**

Machines for wall and fancy papers, baryta papers and tub-sized paper, glass papers and emery cloth. For playing cards and for tinfoils. Pasting machines **FOR BRISTOLS AND ALL SORTS OF CARDBOARDS.**

First Prize (Grand Prix) Golden Medal, Silver Medal.

Collaborator Rewarded at the Exhibition of Paris, 1900.

BRIGHTON TRIMMING BOARDS.

This is a new and thoroughly practical trimming board, with cutting knife and measuring gauges. It is especially fitted to the wants of the amateur, and will be found of great value in the mounting of prints.

5 in......	$0 80	9 in. ...	$1 25
6 "	90	11 "	1 75
7 "	1 00		

E. & H. T. ANTHONY & CO.,

122-124 Fifth Avenue, NEW YORK.

Price List of Carbon Printing.

For those who are not equipped to make carbons, and knowing the demand for carbon prints by those who desire the best, we have installed a CARBON PRINTING PLANT in charge of a most expert carbon printer, enabling us to make carbon prints from your negatives at the following low prices.

Size of Print on Celluloid.	Single Print, Each.		3 Prints from one Negative.		Half Doz. Prints from one Neg.		One Doz. Prints from one Neg.	
	Single Trans.	Double Trans.	Single Trans.	Double Trans.	Single Trans.	Double Trans.	Single Trans.	Double Trans.
Cabinets or smaller..	$0.50	$1.00	$1.35	$2.70	$2.50	$4.00	$4.00	$6.00
6½ x 8½	.75	1.50	2.00	3.60	3.75	6.00	6.00	9.00
8 x 10	1.00	1.75	2.75	4.50	5.00	8.00	8.00	12.00
	one or more, each.							
11 x 14	2.00	3.00						
14 x 17	3.00	4.50						
16 x 20	4.00	6.00						
18 x 22	5.00	7.50						
20 x 24	6.00	9.00						

Size of Print on Paper.	Single Print, Each.		3 Prints from one Negative.		Half Doz. Prints from one Neg.		One Doz. Prints from one Neg.	
	Single Trans.	Double Trans.	Single Trans.	Double Trans.	Single Trans.	Double Trans.	Single Trans.	Double Trans.
Cabinets or smaller..	$0.40	$0.75	$1.10	$2.00	$2.00	$3.50	$3.50	$5.50
6½ x 8½	.60	1.20	1.60	3.00	3.00	5.25	4.80	8.25
8 x 10	.80	1.60	2.15	4.00	4.00	7.00	6.00	11.00
	one or more, each.							
11 x 14	1.75	2.60						
14 x 17	2.50	3.75						
16 x 20	3.20	4.80						
18 x 22	4.00	6.00						
20 x 24	4.80	7.20						

Size of Print on Porcelain.	One or more, Each.	
	Single Trans.	Double Trans.
Cabinets or smaller..	$1.00	$1.50
6½ x 8½	1.50	2.25
8 x 10	2.00	2.75
11 x 14	4.00	6.00
14 x 17	6.00	9.00
16 x 20	8.00	12.00

Prints made between these given sizes are charged at the rate of the next larger size.

CARBON PRINTS ON IVORY.

DOUBLE TRANSFER ONLY.

1 x 1½.....Each,	$1.50	3 x 3¾.......Each,	$4.00
2 x 2½..... "	2.25	4 x 5 .... "	6.00
2¾ x 3½..... "	3.00		

For vignetting carbon prints add one-third to above corresponding price.

For mounting prints on mounts supplied by the customer $1.00 per dozen.

Carbon prints on ivory are especially suited for finishing in oil or water-color by miniature painters. Carbon prints on watch dials or watch cases from negatives supplied by customers at $1.50 each. These prints are permanent and will not fade or discolor.

They are printed from negatives supplied by the customer, and when made by the single transfer, are reversed. All prints, except on ivory, are made by Single Transfer, unless specially ordered to be made by the double. Fourteen tones are made as follows:

NO.	COLORS.	NO.	COLORS	NO.	COLORS.
93.	**Terra Cotta.**	105.	**Sepia.**	152.	**Dark Blue.**
97.	**Warm Sepia.**	106.	**Red Chalk.**	160.	**Platinum Black.**
100.	**Standard Brown.**	113.	**Portrait Brown**	162.	**Brown Black.**
103.	**Warm Black.**	115.	**Lambertype Purple.**	163.	**Blue Black.**
104.	**Engraving Black.**	151.	**Sea Green.**		

No special quality of negative is required; the kind known as clear glass, with not too much contrast, are the best. Foggy, flat or hard negatives should not be expected to yield good carbons.

About ten days are required to complete an order of one dozen from each negative, depending much upon the negative and the weather. From every negative you will get the best Carbon print that it will yield. Having made all arrangements to fill orders promptly, we solicit a share of your patronage.

TERMS, STRICTLY CASH WITH ORDER.

E. & H. T. ANTHONY & CO., 122-124 Fifth Ave., 17th & 18th Sts., NEW YORK.

NO MORE RESIN OR PUMICE STONE.

BORDEAUX'S

FRENCH

Retouching Solution

Is the best thing known for Retouching Negatives.

None Genuine without the Name.

With this Retouching Solution more negatives can be retouched and better work done than in the old way. For retouching locks of hair, scratches and wrinkles in dresses, a Faber No. 2 H. H. may be used, and for general work, a harder lead.

Retouching and Strengthening may be done upon the Glass side.

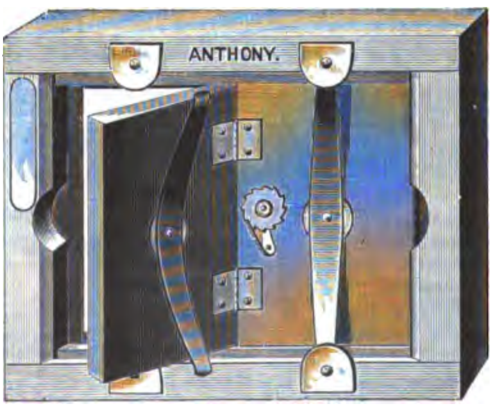
Price, 15, 25 and 50 Cents per Bottle.

E. & H. T. Anthony & Co., *122-124 Fifth Avenue, New York.*

ANTHONY'S IMPROVED PATENT PRINTING FRAMES.

Provided with **SPRING TALLY** and **CELLULOID TABLET** for recording exposures.

THESE FRAMES ARE STRONG AND DURABLE, BUT LIGHT.



PRICES.

Size.	Flat.
3¼ x 4¼	$0.36
4 x 5	.38
4¼ x 5½	.40
4¼ x 6½	.42
5 x 7	.50
5 x 8	.52
6½ x 8½	.60
8 x 10	.75

ANTHONY'S AMATEUR PRINTING FRAMES....

Are made on the same general principle as the Patent Improved Printing Frames, but are of lighter construction, and are manufactured in the smaller sizes only as follows. They are without the printing tally or registering device.

Sizes.	Price.	Sizes.	Price.	Sizes.	Price.	Sizes.	Price.	Sizes.	Price.
2 x 2	$0.25	3 x 3¼	$0.25	3¼ x 3¼	$0.25	3¼ x 4¼	$0.25	4¼ x 4¼	$0.25
2½ x 2½	.25	3 x 3½	.25	3¼ x 4	.25	3½ x 3½	.25	4 x 5	.25

E. & H. T. ANTHONY & CO., NEW YORK.

Standard Photographic Publications.

We carry a Full Line of the most Modern Photographic Text Books. Any Book, either Domestic or Foreign, may be ordered through us, our extensive connection guaranteeing prompt service. . . . . . .

FOR THE BEGINNER.

The Amateur Pointer for Amateur Photographers. A monthly magazine devoted entirely to the wants of the Beginner and Amateur Photographer. Is full of such information as every beginner needs. Plainly written and understandable by all. Subscription, 50 cts. per year.

No. 5. The Ferrotype and How to Make it. By E. M. Estabrooke. Cloth-bound, 176 pp., 12mo. This is the standard work on this subject, and will be read with profit by all who desire to make ferrotypes. Plainly worded and well illustrated. Price, $1.00; postage, 7 cts.

No. 9. Burton's Modern Photography. New edition. By W. K. Burton, C.E. Paper, 126 pp. A splendid book for all who desire to learn photography thoroughly. The various processes are described in a complete yet simple manner. Price, 35 cts.; postage 6 cts.

No. 12. How to Make Photographs. By T. C. Roche. Edited by E. Anthony. Revised and brought up to date by various authorities. Profusely illustrated. This hand-book is absolutely indispensable to both beginner and expert. The best, most comprehensive and reliable work published. No matter how many books you may have, your library is incomplete without a copy of this book. Price, paper covers, 50 cts.; postage, 6 cts.; cloth covers, 75 cts.; postage, 6 cts.

No. 25. Dictionary of Photography. By E. J. Wall. A most valuable book of reference, containing concise and explanatory articles on almost every subject in photography. Useful to both amateur and professional. Printed on heavy coated woodcut paper, 240 pp., handsomely bound in cloth. Price, $1.50; postage, 10 cts.

First Step in Photography. By F. Dundas Todd. A practical aid to the beginner in photography. In paper covers. Price, 25 cts.; postage, 2 cts.

Second Step in Photography. By F. Dundas Todd. A thoroughly practical hand-book for the amateur photographer. In paper covers. Price, 50 cts.; postage, 3 cts.

Amateur Portraiture at Home. By F. Dundas Todd. Clearly and simply written. Illustrated, paper, 50 cts.; postage, 2 cts.

Artistic Landscape Photography. By A. H. Wall. A series of chapters on the practical and theoretical principles of pictorial composition. With numerous illustrations. Price, $1.50; postage, 8 cts.

The Camera and its Appurtenances. By H. J. L. J. Masse. A complete guide to the various appurtenances pertaining to negative making, their uses, etc. Price, 25 cts.; postage, 2 cts.

The Dark-room and its Equipment. By H. J. L. J. Masse. Gives full information regarding dark-room appurtenances. Full of useful hints. Price, 25 cts.; postage, 2 cts.

Indoor Photography and Flashlight Studies of Child Subjects. By Bertha M. Lothrop. Contains over twenty half-tone illustrations. A treatise on flashlight and kindred indoor photography. Price, 25 cts.; postage, 2 cts.

Instantaneous Photography. By Capt. W. de W. Abney. A hand book of practical information on shutter exposures. Price, 60 cts.; postage, 3 cts.

Drop Shutter Photography. By Fred W. Pilditch. Twenty-two half tone illustrations. A guide to shutter photography in all its phases. Price 25 cts.; postage, 2 cts.

Reference Book of Practical Photography. Part I. By F. Dundas Todd. Photography in a Nut-hell. Price. 50 cts.

Reference Book of Photography. Part II. By F. Dundas Todd. Price, 50 cts.

New Pointers for Amateurs. Price, 15 cts.

The Photo-Beacon Exposure Tables. Guaranteed correct for every possible condition out of doors. Price, 25 cts.

ON PRINTING.

No. 33. Carbon Printing. By Max Boelte. Contains explicit instructions for the working of this beautiful process. Prints may be obtained in any color by the carbon process Price. paper, 50 cts ; postage, 2 cts.

The "A B C" Guide to the Making of Autotype Prints in Permanent Pigments. By J. R. Sawyer. Gives full details of the various processes necessary for making carbon prints. Bound in cloth and excellently illustrated. Price, $1 00; postage. 5 cts.

Bromide Paper. Instructions for Contact Printing and Enlarging. By Dr. E. A. Just. With Bromide Paper Frontispiece, and more than thirty illustrations in the text. New edition. 156 pp. Price, 75 cts.; postage, 5 cts.

Platinotype, Its Preparation and Manipulation. By Capt. W. de W. Abney and Lyonel Clark. Original English edition. An exhaustive description of the platinum printing process. Price. $1.25; postage. 5 cts.

Bromide Enlargements, and How to Make Them. By J. Pike. A Capital Treatise on the Subject of Bromide Enlarging. Price, 25 cts.; postage, 2 cts.

Ferric and Heliographic Processes. By C. E. Brown. 1900. (English.) A complete handbook for photographers, draughtsmen, and all who use "blueprint" or allied papers. Illustrated with six actual prints and many diagrams. 130 pp. Cloth, $1.00.

ON RETOUCHING.

No. 6. The Art of Retouching. By J. Ourdan. Illustrated with lithographed drawings and heliotypes. A thoroughly reliable guide. Cloth. Price, $1.00; postage, 6 cents.

The A B C of Retouching. By Andrew Young. With examples of both portrait and landscape retouching, and a guide to the anatomy of expression. Price, 25 cts.; postage, 2 cts.

THE MAGIC LANTERN.

No. 19. The Magic Lantern and its Applications. By L. H. Laudy, Ph D. 8vo. A very complete handbook for the lantern enthusiast. Cloth. Price, $1.00; postage, 9 cts.

Lantern Slides, How to Make and Color Them. Illustrated. By D. L. Elmendorf. A thoroughly practical treatise on lantern slide making. Handsomely bound in cloth. Price, $1.00; postage, 5 cts.

PHOTO-MICROGRAPHY.

No. 36. Photography Applied to the Microscope. By F. W. Mills. With a chapter on mounting objects for the microscope by J. Charters White. Illustrated with half-tone plates and woodcuts. Price, $1.00; postage, 6 cts.

ON PROCESS WORK.

Photo-Engraving, Photo-Etching, and Photo-Lithography. By W. T. Wilkinson. Revised and enlarged by Edward L. Wilson. Ph.D. Illustrated, 180 pp., all new. Only American edition Cloth-bound. Price, $3.00; postage, 14 cts.

The Half-Tone Process. A practical manual of photo-engraving in half-tone on zinc and copper. By Julius Verfasser. Price, cloth, $1.00; postage, 6 cts.

Anderson's Photo-Mechanical Processes and Guide to Color Work. A practical handbook. Copiously illustrated. Gives working details for zinc etching, half-tone, and all the photo-reproduction processes. In flexible leather cover. Price, $5.00; postage, 7 cts.

A Handbook of Illustration. By A. Horsley Hinton. An exhaustive treatise on reproduction methods and the preparation of originals for reproduction. Fully illustrated. 120 pp. Cloth-bound. Price, $1.50; postage, 9 cts.

OTHER STANDARD WORKS.

Telephotography. An Elementary Treatise on the Construction and Application of the Telephotographic Lens. By Thomas R. Dallmeyer, F.R.A.S., Vice-President of the Royal Photographic Society. With 26 plates and 66 diagrams. Price, $4.00.

A Handbook of Photography in Colors. The best work at present available on the subject. Section I.—Historical Development of Heliochromy, General Survey of Processes; Direct Heliochromes and Silver Chloride. By Thomas Bolas. Section II.—Tricolor Photography. By A. A. K. Tallent. Section III.—Lippmann's Process. By Edgar Senior. 200 pp. With Diagrams. Cloth. $2.00.

No. 24. Pictures in Black and White. By George Mason ("Mark Oute"). A racy collection of historical sketches. A capital book, full of genuine humor and very instructive. 12mo. 188 pp. Illustrated. Paper. Price, 25 cts.; postage, 5 cts.

No. 26. The Chemistry of Photography. By Raphael Meldola, F.R.S., Professor of Chemistry at the Technical College, Finsbury, London. Crown 8vo. Cloth. Price, $2.00; postage, 11 cts.

Wilson's Cyclopaedic Photography. The most comprehensive photographic dictionary ever published. A complete handbook of the terms, formulas, processes, apparatus, and applications of photography. Cloth. Price, $4.00; postage, 23 cts.

Wilson's Quarter Century of Photography. By Edward L. Wilson, Ph.D. "The best of everything boiled out from all sources." Profusely illustrated, and with notes and elaborate index. Price, $4.00; postage, 23 cts.

Wilson's Photographics. "Chautauqua Edition." With Appendix. By Edward L. Wilson, Ph.D. A most complete photographic lesson book. Covers every department. 352 pp. Finely illustrated. Price, $4.00; postage, 20 cts.

Wilson's Mosaics. Paper cover. Price, 50 cts.; postage, 6 cts.

Crayon Portraiture. By J. A. Barhydt. Complete instructions for making crayon portraits on crayon paper, and on platinum, silver, and bromide enlargements. Also directions for the use of transparent water colors and the making of French crystals. Price, paper, 50 cts.; postage, 7 cts. Cloth, $1.00; postage, 10 cts.

Artistic Lighting. By James Inglis, with chapters on "At Home" Portraiture by Daylight and Flashlight, by F. Dundas Todd. Price, 50 cts.; postage, 2 cts.

The Art of Making Pictures in Crayon on Solar Enlargements. By E. Long. Third edition, revised. Price, $1.00; postage, 3 cts.

The Reducer's Manual and Gold and Silver Worker's Guide. By Victor C. Bloede. Second edition. Price, 25 cts.; postage, 6 cts.

The Lighting in Photographic Studios. By P. C. Duchochois. Price, 75 cts.; postage, 3 cts.

Practical Essays on Art. By John Burnett. Containing 130 illustrations, including examples from many of the old masters. Price, cloth, $1.00; postage, 10 cts.

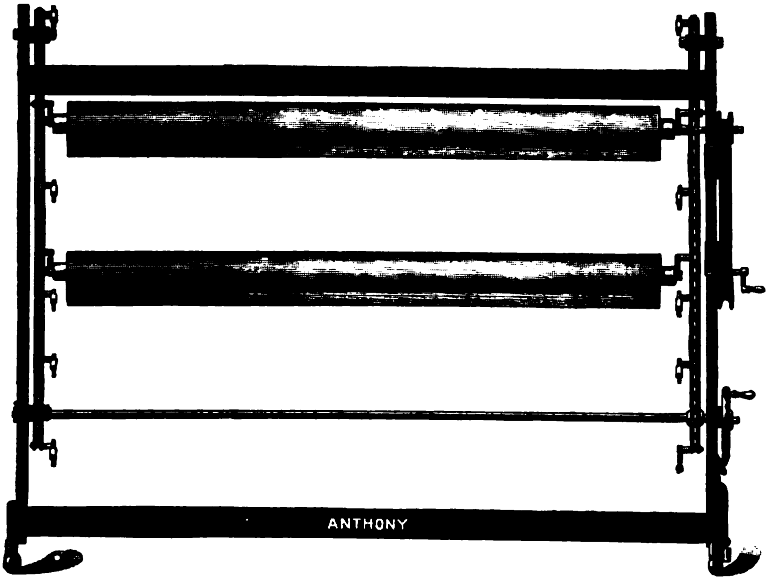
Elements of a Pictorial Photograph. By H. P. Robinson. With 37 illustrations and frontispiece. Price, $1.50; postage, 8 cts.

E. & H. T. Anthony & Co., 122-124 FIFTH AVENUE, NEW YORK.

The Farrand Background Carrier

SAVES LABOR AND ECONOMIZES SPACE IN THE OPERATING ROOM.

Has a Carrying Capacity of 16 Ten-Foot Backgrounds.



Finished in Whitewood, durably constructed.

Easily worked and simple in adjustment.

All grounds on one carrier.

Change of ground easy and practically instantaneous.

No more heavy rollers to be handled.

CARRIER Fitted with Two Rollers, **$50.**

For Sale by all Dealers.

MANUFACTURED BY

E. & H. T. ANTHONY & CO.

122-124 FIFTH AVENUE, NEW YORK.

The BRIGHTON Tripod.

Price, $1.50.

Tripods

Light, Strong, Neat, Efficient,

and made with Special Reference to use with . . . .

Hand Cameras.

The BABY TRIPLEX.

Similar to the Triplex Junior but still lighter.

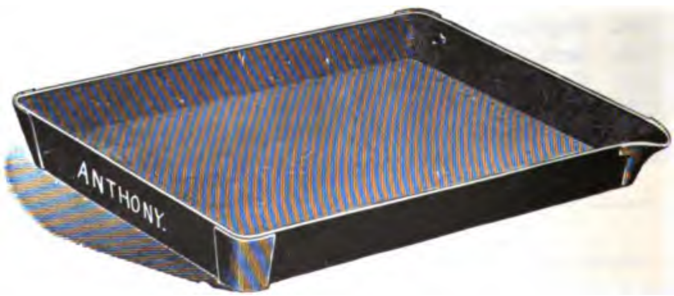
Price, $2.00.

The TRIPLEX JUNIOR Tripod.

Price, $2.75.

E. & H. T. ANTHONY & CO., — New York.

The Empire Hard Rubber Trays

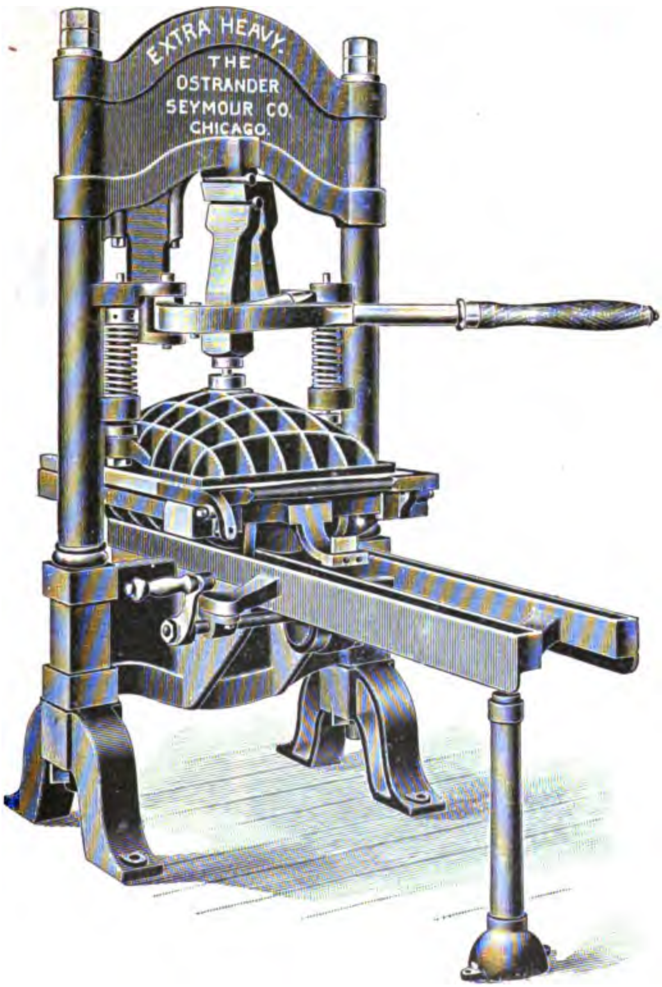


These Trays are deeper than any heretofore offered to the trade in the smaller sizes, and as deep as any in the larger sizes. Following are the sizes and prices:

Size.	Price.
4¼ x 5¼	$0.40
5¼ x 7¼	.50
5½ x 8½	.60
7 x 9	.75
8½ x 10½	1.00

E. & H. T. ANTHONY & CO., 122-124 FIFTH AVENUE, NEW YORK.

SEND FOR COMPLETE CATALOGUE.



"Extra Heavy" Photo-Engravers' Proof Press.

THE OSTRANDER-SEYMOUR CO.

MANUFACTURERS OF IMPROVED

Photo-Engraving, Electrotyping and Stereotyping Machinery

General Offices: Ostrander Building,
88, 90 and 92 West Jackson Street,

Works on Pennsylvania Railroad,
55th Street and Stewart Avenue,

CHICAGO.

Unfinished!

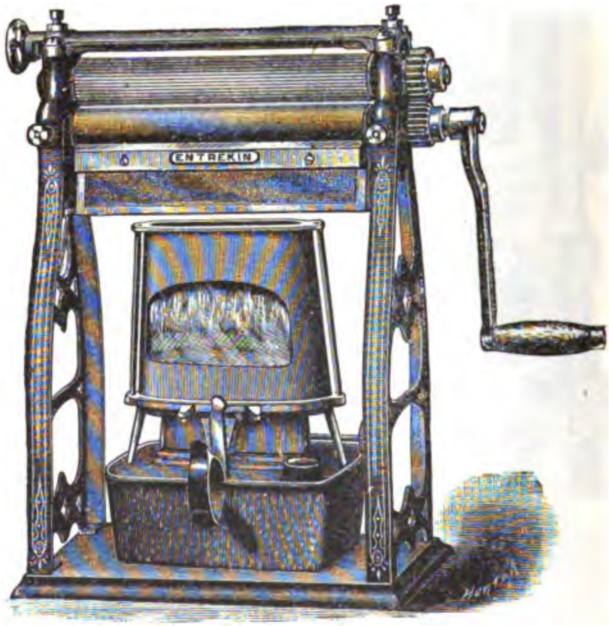
A Print, unless it has been through an

ENTREKIN

PATENT IMPROVED

ROTARY BURNISHER.

With Turn Back Roll and Swing Fire Pan.



May be used with either Gas or Oil.

Your Supply House will send you Descriptive Pamphlet.

THE CHEAPEST AND BEST MACHINES NOW IN THE MARKET

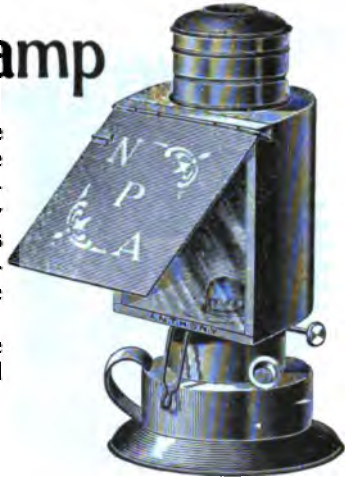
PRICES:

8-inch Roll	$12.00	20-inch Roll	$40.00
10-inch Roll, Light	15.00	25-inch Roll	45.00
15-inch Roll	30.00		

E. & H. T. ANTHONY & CO., Sole Agents,

122-124 Fifth Avenue, 17th and 18th Streets, New York.

The "N.P.A." Lamp



A very simple, safe and effective lamp. The wick carrier may be readily removed and a candle substituted. Well made and perfectly safe. A shade screens the operator's eyes from the light, and when entirely down serves to protect the glass.

It is provided with both an orange and a ruby glass, which may be used singly or in combination.

Price, complete, $1.00.

The Rex Lamp

A small, compact Ruby Lamp, burning kerosene oil. The wick is controlled by an exterior thumb screw. It is fitted with detachable can for oil, and the Ruby Glass measures 2⅞ x 4 inches.

Price, 50 cents.

The Ascot Lamp

Is fitted with both Orange and Ruby Glass, 4 x 5 inches, in separate grooves. It burns kerosene oil, wick is controlled from the outside; and its back, being semicircular, serves as a good reflector. All seams are lapped. It is enameled in black, and has detachable oil can.

Price, 75 cents.

E. & H. T. ANTHONY & CO.,

122-124 Fifth Avenue, 17th and 18th Streets, New York.

GATCHEL and MANNING

WE CATER FOR THE TRADE WHO DESIRE ENGRAVINGS in Half-tone·Photo-line·Wood for CATALOGUES and ADVERTISEMENTS

ILLUSTRATORS & DESIGNERS

SKETCHES furnished for the asking With ESTIMATES for REQUIREMENTS

33 South 6th St
PHILADELPHIA: PA

Plates to Print in one or more Colors on a Type Printing Press.

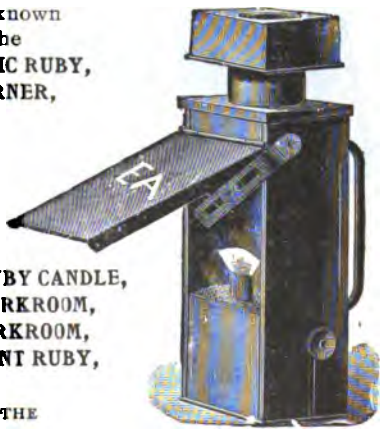
DARKROOM LAMPS.

IN GREAT VARIETY.

And at prices ranging from **40 cents** to **$6.00**, and including such well-known styles as the

ACME ELECTRIC RUBY,
ACME GAS BURNER,
HOLIDAY,
N. P. A.,
THE REX,
THE ASCOT,
STANDARD OIL,
E. A. POCKET,
TISDELL RUBY CANDLE,
CLIMAX DARKROOM,
HELIOS DARKROOM,
LITTLE GIANT RUBY,
IMPERIAL,
AND THE
PERFECT DRY PLATE LANTERN.

Standard Oil Lamp.
Price, $1.50

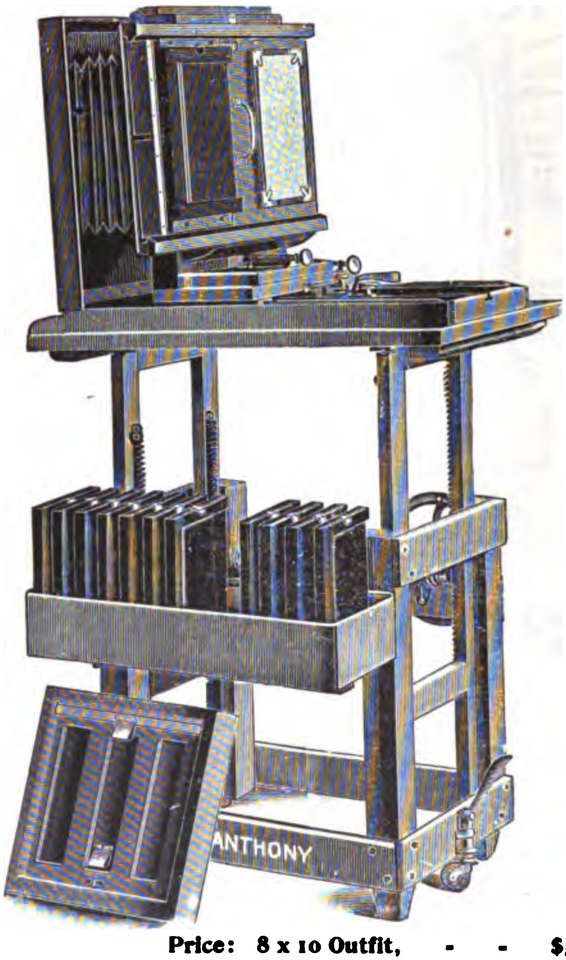


E. A. Pocket Ruby Lantern.
Price, 50 cents.

E. & H. T. ANTHONY & CO., 122-124 Fifth Ave., N. Y.

New York Studio Outfit.

THE BEST ON THE MARKET.



8 x 10 Mahogany Portrait Camera, One Benster Holder.

Anthony's Automatic Cabinet Attachment, One Curtain Slide Holder.

No. 1 New York Camera Stand.

Holder Rack, Made to Carry Twelve Holders.

Price:	**8 x 10 Outfit, - -**	**$50.00**
	11 x 14 " - - -	**75.00**

New York Outfits must be ordered complete in order to obtain outfit price, otherwise each part will be charged for separately at its respective price.

ALL HOLDERS NOW FITTED WITH CURTAIN SLIDES.

MANUFACTURED BY

E. & H. T. ANTHONY & CO., NEW YORK.

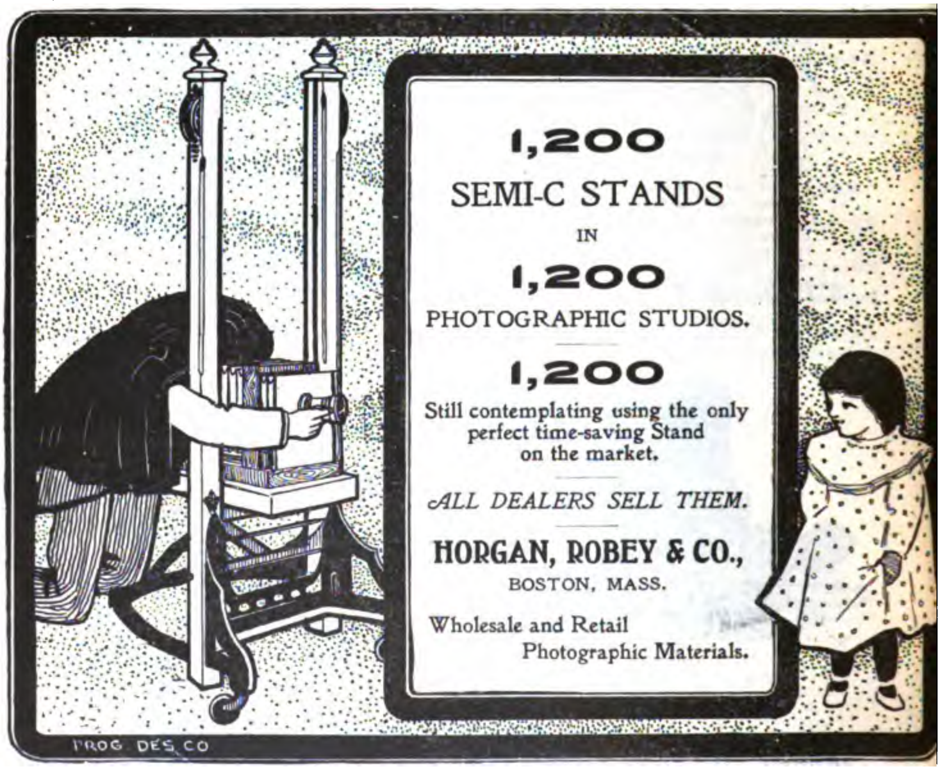
Hartel Photo-Engraving Co.

PHOTO ENGRAVINGS...

FOR ALL ILLUSTRATIVE AND ADVERTISING PURPOSES.

THREE-COLOR PROCESS PLATES A SPECIALTY.

No. 37 East Eighth Street,
New York, N. Y.



ECONOMY RUBBER TRAY

As will be seen by the cut, the glass negative lies flat on the bottom of the tray, necessitating the least possible quantity of developer, and the depressed channel in bottom of tray is sufficiently deep to allow the finger or plate-lifter to engage firmly underneath the plate and remove it without risk of scratching. They are of polished hard rubber.

SIZE.	PRICE.	SIZE.	PRICE.	SIZE.	PRICE.
3¼ x 4¼	$0.30	5½ x 8½	$0.65	8½ x 10½	$1.25
4 x 5	.35	7 x 9	.85		

E. & H. T. ANTHONY & CO., 122-124 Fifth Ave., New York.

GLASS TRAYS.

The first requisite of a good all-round tray is that it may be EASILY KEPT CLEAN.

Another is that it shall be INEXPENSIVE, and with both these points it must be LIGHT AND STRONG. All of these good qualities are to be found in our GLASS TRAYS and PORCELAIN GLASS TRAYS, which are manufactured in White and Amber Glass, White Porcelain Glass and Black Glass. These trays do not break with a sudden change of temperature.

These goods are admirably adapted to use in the darkroom and their differing colors make them easily distinguishable and prevent their being put to other than their proper uses.

WHITE PORCELAIN GLASS TRAYS.

For Plates.	Price.
4 x 5	$0 20
5 x 8	30
7 x 9	50
8 x 10	60

BLACK GLASS TRAYS.

For Plates.	Price.
4 x 5	$0 20
5 x 8	30
7 x 9	50
8 x 10	70

WHITE OR AMBER GLASS TRAYS.

For Plates.	Price.
4 x 5 or under	$0 16
5 x 8 "	25
7 x 9 "	40
8 x 10 "	50

The Best Value for the Money in the Market.

E. & H. T. ANTHONY & CO.,

122-124 FIFTH AVE., 17th and 18th Sts., NEW YORK.

Linen Prepared Trays.

A new tray especially adapted for toning and washing prints. It is being used by the leading photographers in New York City, and giving entire satisfaction. A trial will demonstrate its merits.

Size.		Price.
17 x 21	4 in. deep	$3 50
20 x 24	4 "	4 00
21 x 27	4 "	5 00

E. & H. T. Anthony & Co., 122-124 Fifth Ave., N. Y.

INSTANTANEOUS EXPOSURES

THE CLEANEST, MOST UNIFORM AND RELIABLE PLATE ON THE MARKET.

HAMMER
EXTRA FAST
PLATE

CONCEDED BY ALL TO BE THE RIGHT SPEED.

HAMMER DRY PLATE CO., ST. LOUIS, MO.

Send for Hammer's Little Book, A Short Talk on Negative Making, mailed free to any address.

PRINT MOUNTERS AND ROLLERS.

ANTHONY'S SQUEEGEE ROLLER.

Answers the purpose of both squeegee and print mounter, being adapted for prints of all sizes. It consists of a single roller, made of the finest velvet rubber, fastened to a single handle. When in use for mounting the handle is set at right angles to the roller.

Price, 6 in........ $0 75 | Price, 9 in........ $1 00

THE SUCCESS PRINT MOUNTER.

A THOROUGHLY PRACTICAL SQUEEGEE MOUNTER.

Price, 6 in................... $0 40 | Price. 12 in................. $0 60

THE AZA PRINT MOUNTER.

A STRONG, LIGHT, AND INEXPENSIVE MOUNTER.

Price $0 20

E. & H. T. ANTHONY & CO., 122-124 FIFTH AVENUE, NEW YORK.

The Unique Photo Mountings

ARE ABSOLUTELY THE BEST.

If you want Photo Jewelry, buy the kind that every one knows to be the best for the money.

THE UNIQUE, KNOWN EVERYWHERE

Sold by all Photo Supply Houses and Manufacturers of Photo Buttons.

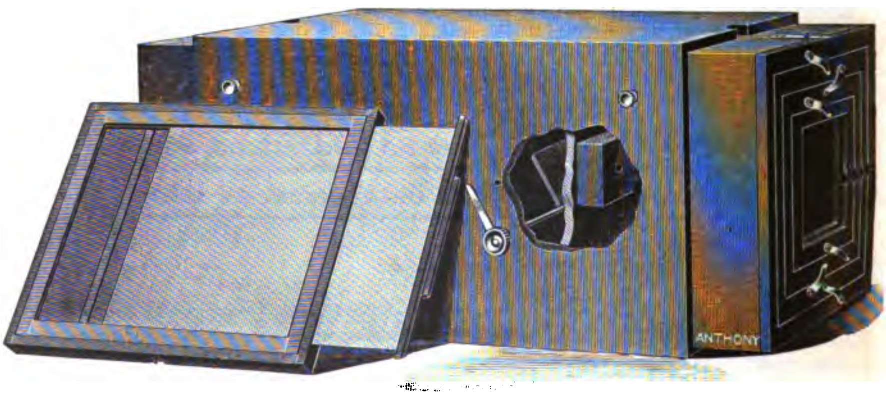
F. H. NOBLE & CO., 103 State St., CHICAGO, ILL. 51 & 53 Maiden Lane, N. Y.

The BRIGHTON

(8 x 10)

ENLARGING AND COPYING CAMERA

FOR PLATES OR PAPER.



THIS camera is completely equipped for Enlarging or Copying, either on plates or paper. It consists of two boxes within an outer case, both of which may be drawn out to meet the desired focus. It is fitted with lens and shutter (the latter operating from the outside of camera), ground-glass and plate holder in which either plates or paper may be used. The front of camera has a nest of kits from 4 x 5 up to 8 x 10 for use in making enlargements on paper from negatives of any of these various sizes. In copying, simply draw out front box, which then leaves a copying camera, and extend the back box to desired focus.

In constructing this camera, the demand for a good, practical but cheap camera was considered, and it can therefore be sold at the extremely low price of

$12.00 COMPLETE.

It is especially useful for amateurs who are desirous of making enlargements from their own negatives—an important factor in the enjoyment of Photography.

Manufactured ... by ... **E. & H. T. ANTHONY & CO.,**

122-124 FIFTH AVE., NEW YORK,

The Clifton Camera

LIGHT, STRONG, DURABLE.

THIS is an entirely new departure in view cameras, and embodies every good feature, without detracting in any way from the three great essentials of a perfect camera—**compactness, rigidity, and ease of working.** Every movement is provided for, and held in place by the best device that experience furnishes. There is **no demand** to be made upon this camera that **it will not meet.** It has front and back focus, the latter making possible the use of extremely wide-angle lenses; double-swing back, double-swing front, reversible back, sliding and rising front, spring-actuated ground glass, and the front board is very large, overcoming the difficulty so often experienced when it is desired to attach special lenses. It is handsome in appearance, constructed of the very best material, and fitted with Zephyr Holder and a substantial canvas carrying case.

Size, 5 x 7	$15 00	Size, 8 x 10	$17 00
" 5 x 8	15 00	" 11 x 14	30 00
" 6½ x 8½	16 00	" 14 x 17	45 00

LONG FOCUS CLIFTON.

Especially adapted to the use of **Telephoto** and **Other Lenses of Extra Long Focus.** It combines all the advantages of the regular Clifton Camera and is the **finest box of its kind in the market.**

Size, 6½ x 8½ . . . $30 00 | Size, 8 x 10 . . . $40 00

Manufactured by

E. & H. T. ANTHONY & CO., New York.

Good Cuts Produce Faith in the Articles Advertised.

Photo-Chromotype Engraving Co.,

206-214 South Eleventh Street, Philadelphia, Pa.,

Are specialists in all known branches of Engraving, combining all the different departments under one roof.

Catalogue and Booklet Covers Handsomely Designed.

REQUESTS FOR ESTIMATES SOLICITED.

Anthony's Automatic Electric Focusing Lamps

FOR PHOTO ENGRAVERS.

Operate SINGLY or in SERIES on 110, 220 or 500 volt D. C. incandescent circuits.

These Lamps are sold under the conditions that if not found as represented they may be returned.

PRICE.

Including rheostat to operate on 110 volt continuous circuit.

Lamps for 220 or 500 volt D. C. or alternating system, an extra price charged.

					Each.
25 amperes, about		5,000 candle power,			$50 00
50	"	" 10 000	"	"	60 00
60	"	" 12,000	"	"	65 00

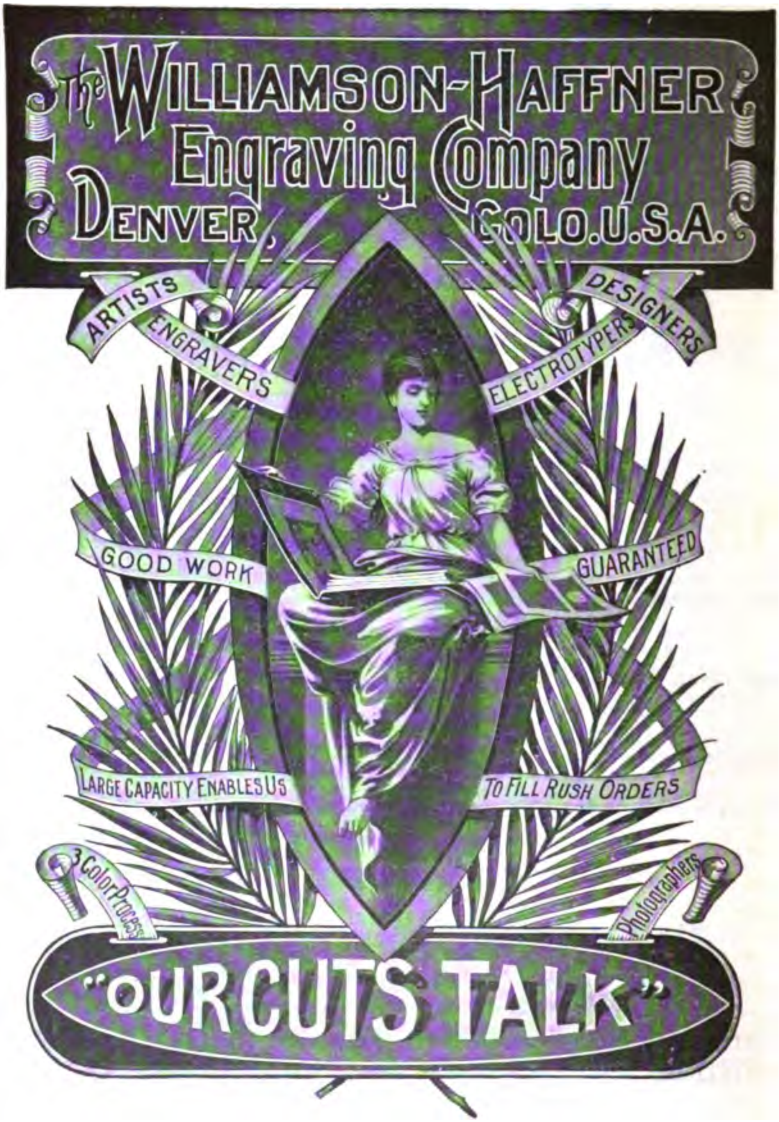
Weight of lamp complete, about 45 lbs.

When ordering Lamps, state whether the continuous or alternating system of lighting will be used, together with the voltage of the same, and whether to operate singly or in series.

CARBONS.

Imported,	9-16 x 12 inch,	Cored,	per 100,	$3 40
"	9-16 x 7 "	Solid,	" 100,	3 25

E. & H. T. ANTHONY & CO., New York.

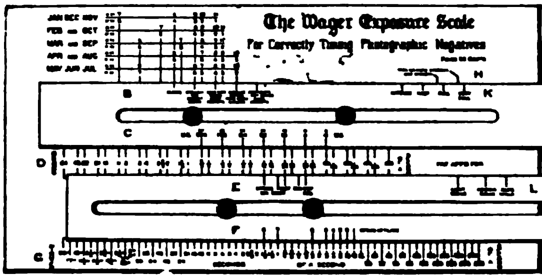


SEE OUR COLOR PRINT OF

MOUNT OF THE HOLY CROSS

IN THIS ISSUE

THE WAGER EXPOSURE SCALE.



Absolutely Accurate under all Conditions. Practically Instantaneous. Adapted to all Subjects.

It can be carried in the vest pocket, can be used with any Camera made. Full directions are on every Scale. . . . . .

Price, ... 50 Cents by Mail Postpaid.

Handsomely Finished in Aluminum, with Sliding Parts of Celluloid, price, $1.00.

OPINIONS OF THOSE WHO HAVE USED IT.

WINNIPEG, Manitoba, Dec. 19, 1900.

Gentlemen,—Having already on hand several White Elephants in the shape of Photographic Exposure Indicators, and honestly believing that if you wish to own the best, you must purchase the last on the market, I herewith enclose express order for a "Wager."

Yours truly, G. B. BORRADAILE.

WINNIPEG Manitoba, 2-27-1901.

Gentlemen,—Having given your Company's Exposure Scale a thorough test, can vouch for its accuracy in determining the correct exposure to give in photographing subjects under stated conditions recorded thereon.

Yours truly, G. B. BORRADAILE.

DES MOINES, Iowa, 8-16-1900.

Gentlemen,—Enclosed find payment for one of your Exposure tellers; I have several no earthly use I do hope you have something of some value.

Yours truly, GEO. W. JONES.

DES MOINES, Iowa, 9-5-1900.

Gentlemen,—For simplicity and compactness the Wager Scale is the best one I have seen.

It is all before one at a glance. I have found it reliable for outdoor exposures; carry it with me and am highly pleased with it. Yours truly, GEO. W. JONES.

SARATOGA SPRINGS, N. Y., 10-27-1900.

Gentlemen,—Enclosed find stamps for another Wager Scale. I find this Scale very accurate. Yours truly, S. I. YOUNG.

BELLE HAVEN, Va., 10-23-1900.

Gentlemen,—I enclose stamps, for which please send by mail at once to ——— one Wager Exposure Scale. Yours truly,

SEYMOUR BLAIR WARD, M.D.

SAVANNAH, Ga., July 30, 1900.

Gentlemen,—I have tested your Scale, and find it works perfectly, and am fully satisfied with it. What I like about it is the celerity with which you can find the exposure, as, when you get familiar with it, it does not take more than ten seconds. Several of our members are very much impressed with it, and I send $3, for which please send me as many as you can.

Yours truly, PERCY SUGDEN.

ROCKVILLE, Conn., 10-30-1900.

Gentlemen,—Your Wager Exposure Scale is *all right*. A person using it should get nearly 100 per cent. good negatives. I am satisfied that your scale is certainly the best thing of the kind I have seen used, both for outdoor and indoor work.

I notice in the "Camera" you have advanced the price, and it is well worth the money. Send me another, in case I should lose this one.

Yours truly, WM. C. MACGEORGE.

PARSONS, Kansas, 10-29-1900.

Gentlemen,—I could not do without your Exposure Scale.

Yours truly, J. W. WRIGHT.

FRANKFORT, Ky.

Gentlemen,—I have received the Exposure Scale ordered by me, and I am very much pleased with it. Enclosed find stamps, for which send me another.

Yours truly, J. L. EDELEN.

DANIELSON, Conn., 1-14-1901.

Gentlemen,—Enclosed please find 50 cents, for which send me one of your Exposure Scales.

I have had one, and sold it to a friend, and think it the best thing I ever saw for the purpose. Have tried some interiors, timing according to the "Scale," meeting with fine success, and I had never dared attempt them before. An early reply will oblige,

Yours truly, ARTHUR SCOTT.

FRANK, Humboldt Co., Cal., 10-8-1900.

Gentlemen,—I have been using one of your Exposure Scales for about six months, and it is O. K. It has saved me many a plate.

Yours truly, P. MAXWELL.

811 Monadnock Block,
CHICAGO, Ill., 12-31-1900.

Gentlemen,—After examining carefully every exposure indicator and meter at present sold in the United States, I find yours to be the most reliable, and the easiest and quickest manipulated of any.

It is without exception the *Best!* I enclose stamps for two more, one for ——— Dallas, Texas, and the other for myself here. Yours truly, B. F. KNAPP.

COLUMBIA, Ill., 1-4-1901.

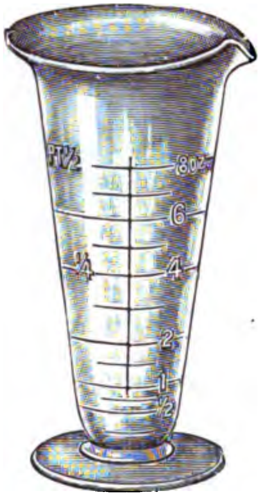
Gentlemen,—Received the Scale you sent me some time since. It is a sure enough "good thing." I enclose 50 cents, for which send me another by return mail.

Yours truly, J. M. NIXON.

E. & H. T. ANTHONY & CO., 122-124 FIFTH AVE., NEW YORK,
17TH AND 18TH STREETS,

GLASS GRADUATES.

A good graduate is the first requisite of the dark-room. All our graduates are accurately marked and thoroughly reliable.



THE CLIMAX GRADUATE.

The TUMBLER GRADUATE is a low priced graduate of excellent make and material. It is manufactured in three sizes as noted below. **Its figures are in relief** on the surface of the graduate, which makes it very convenient in the dark-room.

2 ounce ....$0 08 | 4 ounce $0 10
8 ounce..................$0 15

The CLIMAX GRADUATE is one that will find great favor with photographers. **The measuring lines are sunk into the glass**, and the **figures are raised**, thus permitting of easy reading even in the dark-room.

1 ounce	$0 12	4 ounce	$0 20
2 "	15	8 "	30
16 ounce	$0 40		

ANTHONY'S MOLDED GRADUATES are of uniform size and accurate makings, and are made in the following sizes:

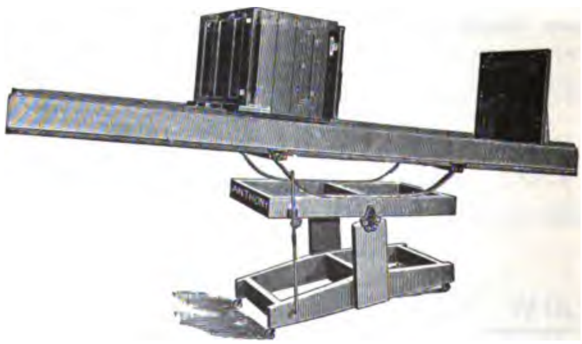
WARRANTED ACCURATE

Minim	$0 25	6 ounce	$0 30
2 dram	25	8 "	40
½ ounce	17	12 "	50
1 "	17	16 "	60
2 "	20	24 "	75
3 "	22	32 "	1 10
4 "	25	64 "	1 50

E. & H. T. ANTHONY & CO., 122-124 Fifth Ave., New York.

Anthony's Process Camera Stand

HUNDREDS IN DAILY USE



PRICES, INCLUDING COPY BOARD HOLDER:

FOR CAMERA	LENGTH OF BED	PRICE	FOR CAMERA	LENGTH OF BED	PRICE
8 x 10	8 feet	$15.00	17 x 20	15 feet	$27.00
10 x 12	9 "	18 00	18 x 22	18 "	30.00
11 x 14	10 "	21.00	20 x 24	20 "	36.00
14 x 17	12 "	24.00			

Special sizes to order.

E. & H. T. ANTHONY & CO., NEW YORK.

MONARCH MATTE AND MONARCH GLACÉ

Are Three Times Quicker Printing than any other Collodion Papers on the Market . . . .

which is a great advantage in dull or cloudy weather.

You can easily obtain desired tones on either Monarch Matte or Monarch Glacé with the solutions you now use, but for the best results use the "**Monarch Solutions,**" which are especially prepared and carefully compounded for use with our papers.

PRICE LIST.

MONARCH MATTE

SIZE	½ Doz.	Doz.	½ Gr.	Gr.
2½ x 2½	2 dz.	.30	.70	1.20
2¼ x 3¼	2 dz.	.30	.70	1.20
2¼ x 3½	2 dz.	.30	.70	1.20
2¼ x 3¾	2 dz.	.30	.70	1.20
2½ x 4¼	2 dz.	.30	.70	1.25
3½ x 3½	2 dz.	.30	.80	1.50
3 x 4	2 dz.	.30	.70	1.20
3½ x 4	2 dz.	.30	.80	1.50
4 x 4	1 dz.	.20	.90	1.65
3¼ x 4¼	2 dz.	.30	.80	1.50
4¼ x 4¼		.20	.90	1.65
3⅞ x 5½, Cabinet		.25	1.10	2.00
3⅞ x 5⅞		.30	1.25	2.25
4 x 5		.20	.90	1.65
4¼ x 5½		.30	1.25	2.25
4 x 6		.30	1.25	2.25
4¼ x 6½		.30	1.50	2.60
4¾ x 6½		.30	1.70	2.90
4 x 9, Celoron Panel		.35	......	3.30
5 x 7		.35	1.95	3.20
5 x 7½		.40	2.10	3.50
5 x 8		.40	2.10	3.60
5½ x 7¾, Paris Panel		.45	2.30	4.00
6 x 8		.50	2.70	4.80
6½ x 8½		.55	2.90	5.10
7 x 9		.60	3.30	6.00
7½ x 9½		.65	3.75	7.00
8 x 10		.75	4.20	7.80
10 x 12		1.10	6.30	12.00
11 x 14	.75	1.45	8.40	15.60
12 x 15	.90	1.65	9.90	18.60
14 x 17	1.15	2.20	12.60	24.00
16 x 20	1.50	2.90	16.80	32.40
17 x 20	1.65	3.20	18.00	34.80
18 x 22	1.90	3.60	21.00	40.80
20 x 24	2.20	4.20	24.60	48.00
Cabinet Seconds				1.60

Cabinet Seconds.... 100-sheet package, 1.15
Cabinet Thirds..... 100-sheet package, .75

10-ft. roll, 24½ in. wide 2.25
5-yd. roll, " " " 3.25
10-yd. roll, " " " 6.00

Roll paper not furnished in smaller sizes or lengths than shown. Special sizes at proportionate prices on orders amounting to $1.00 list or more.

MONARCH GLACE

SIZE	½ Doz.	Doz.	½ Gr.	Gr.
2½ x 2½	2 dz.	.25	.60	1.00
2¼ x 3¼	2 dz.	.25	.60	1.00
2¼ x 3½	2 dz.	.25	.60	1.00
2¼ x 3¾	2 dz.	.25	.60	1.00
2½ x 4¼	2 dz.	.25	......	......
3½ x 3½	2 dz.	.25	.70	1.25
3 x 4	2 dz.	.25	.60	1.00
3½ x 4	2 dz.	.25	.70	1.25
4 x 4	2 dz.	.25	.70	1.25
3¼ x 4¼	2 dz.	.25	.70	1.25
4¼ x 4¼	2 dz.	.30	.75	1.35
3⅞ x 5½, Cabinet		.20	.90	1.60
3⅞ x 5⅞		.20	.90	1.60
4 x 5		.15	.75	1.35
4¼ x 5½		.20	.90	1.60
4 x 6		.20	.90	1.60
4¼ x 6½		.25	1.25	2.10
4¾ x 6½		.25	1.40	2.40
4 x 9, Celoron Panel	......	......	......	......
5 x 7		.30	1.60	2.65
5 x 7½		.30	1.70	2.90
5 x 8		.30	1.75	3.00
5½ x 7¾, Paris Panel		.35	1.90	3.25
6 x 8		.40	2.25	4.00
6½ x 8½		.45	2.40	4.25
7 x 9		.50	2.75	5.00
7½ x 9½		.55	3.25	6.00
8 x 10		.60	3.50	6.50
10 x 12		.90	5.25	10.00
11 x 14	.65	1.20	7.00	13.00
12 x 15	.75	1.35	8.25	15.50
14 x 17	.95	1.80	10.50	20.00
16 x 20	1.25	2.40	14.00	27.00
17 x 20	1.35	2.60	15.00	29.00
18 x 22	1.60	3.00	17.50	34.00
20 x 24	1.85	3.50	20.50	40.00
Cabinet Seconds				1.20

Cabinet Seconds... 100-sheet package, .85
Cabinet Thirds.... 100-sheet package, .60

10-ft. roll, 24½ in. wide 1.75
5-yd. roll, " " " 2.50
10-yd. roll, " " " 4.50

Roll paper not furnished in smaller sizes or lengths than shown. Special sizes at proportionate prices on orders amounting to $1.00 list or more.

If your dealer is bound to the "Trust," you cannot do better than order "**Monarch Products**" direct from Messrs. E. & H. T. Anthony & Co., Sole Trade Agents, who have been and are at all times identified with the best interests of the fraternity.

MONARCH PAPER COMPANY,

BINGHAMTON, N. Y.

E. & H. T. Anthony & Co. MONARCH **122-124 Fifth Avenue,**

Sole Trade Agents, **New York.**

TRADE MARK

Complete Photographic Equipments

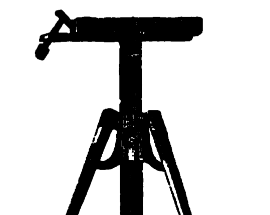
For the convenience of many who prefer to purchase Camera, Plate Holder, Lens and Tripod together, we supply several styles and sizes which will be found fully described in our catalogue. These outfits are especially useful for the out-of-door photographer and beginner.

PRICES OF OUTFITS COMPLETE ARE LESS THAN FOR THE SEVERAL PARTS ORDERED SEPARATELY. - - - - - -

SEND FOR CATALOGUE

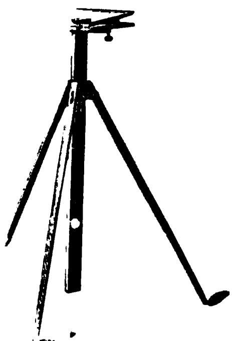
E. & H. T. Anthony & Co., 122-124 Fifth Avenue, New York.

Iron Center Stand.



This is a favorite cheap stand. Being in walnut and the iron center bronzed, its general appearance is pleasing.

Price for 1-4, 1-2, 4-4, and 8 x 10 . . $3 50

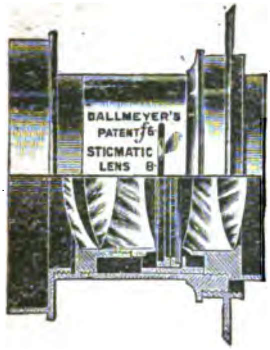


The Daisy Camera Stand.

Quite similar to the Iron Center, but of a little lighter construction Well made, strong, light and serviceable ; finely adapted to the smaller sizes of portrait cameras.

Price..............................$2 50

E. & H. T. ANTHONY & CO., 122-124 Fifth Ave., N. Y.



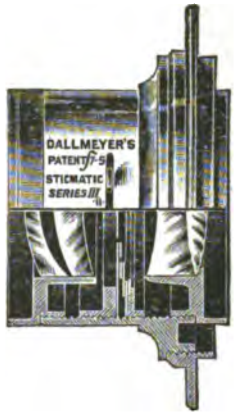
A NEW UNIVERSAL LENS.

Dallmeyer's
Stigmatic Series II: *f*6.

For all Work from Portraiture to Wide Angle.

The front and back combinations of these Lenses have respectively an equivalent focal length equal to 1½ or 2 times that of the entire Lens, and may be used separately, each Lens thus giving a **choice of three different foci.**

Stigmatic Series III: *f*7.5.

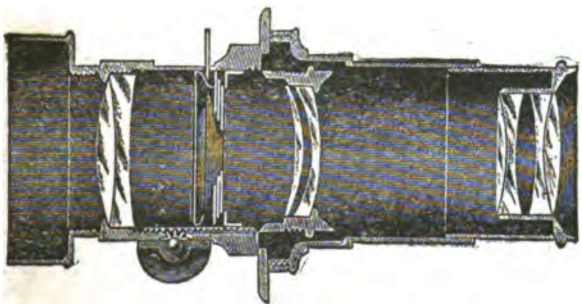


This series of Lenses is designed to take the place of the ordinary R. R. for all classes of work. They cover a wide angle with perfect flatness of field and freedom from astigmatism.

N. B —This Lens is not convertible, and must be used intact.

Dallmeyer's Telephotographic Lenses and Attachments.

For work involving the use of a VERY LONG FOCUS LENS with the ORDINARY CAMERA EXTENSION.



Supplementary Negative High Power.

No. 1 MODERATE POWER TELEPHOTO LENS.

***HIGH POWER.**—Suitable where great magnification is required. Angle included* 13°.

***MODERATE POWER.**—For ordinary work. Sufficiently rapid for instantaneous exposures. Angle included* 17°-21°.

☞ *Catalogues, with full particulars, prices, working data, etc., free on application.*

Sole Agents for the United States, E. & H. T. ANTHONY & CO., New York.

J. H. DALLMEYER, Ltd., 25 Newman Street,

Optical Manufactory. LONDON, W.